Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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~ and 35 others

Vol. 9 No. 4 April 1956

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DOUGLAS McKAY, Secretary

FISH AND WILDLIFE SERVICE

JOHN L. FARLEY, Director

Commercial Fisheries Abstracts

Prepared in the Branch of Commercial Fisheries

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The abstracts in this leaflet may be left in their present form; but it is suggested that to make the most efficient use of them, they be cut out on the lines designated and filed by the number in the upper left-hand corner of each. For a full description of this filing system see "Fishery Technological Abstract Card System" by Maurice E. Stansby and K. L. Osterhaug, Fishery Leaflet No. 232, obtainable free by request from Fish and Wildlife Service, Washington 25, D. C.

In addition to the regular abstracts, there is included a bibliography of references of secondary importance (without abstracts). These may be cut off on the lines designated and pasted on standard 3 x 5-inch cards for filing.

Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0	General and theoretical	5	Vitamins
1	Fish by species	6	Fishery byproducts
2	Fresh fish	7	Analytical Methods
3	Preserved fish	8	Composition
4	Oils	9	Miscellaneous

Issued with the approval of the Bureau of the Budget, December 29, 1953

0.7 PARTIAL LIST OF REFERENCES ON THE UNIDENTIFIED GROWTH FACTORS IN FISHERY PRODUCTS

Sanford, F. Bruce (Fishery Technological Laboratory, Fish and Wildlife Service, Seattle, Washington)
Manuscript Report S-173 (September 1954) Technological Laboratory, Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Seattle, Washington.

The purpose of this list was to aid in the search for unidentified factors in fishery products.

To have limited the list strictly to the subject indicated in the title, however, would have largely defeated its purpose, for the elucidation of the growth factors in these fishery products has involved much work with the "animal protein factor", vitamin B_{12}, and antibiotics. Furthermore, the rate of progress has been determined in no small part by the adequacy of the available assay methods. It was therefore felt that these other subjects should be included.

The list was prepared almost exclusively from articles appearing in Commercial Fisheries Abstracts. Inasmuch as this journal covers only 73 periodicals largely published in the United States, undoubtedly many important references, especially those in the foreign literature, have been omitted. It is for this reason that the word "partial" appears in the title.

Progress in the field of unknown growth factors has been so rapid that the significance of many of the articles is lost unless consideration is given to the time at which the work was done. Therefore, in order that the historical perspective could be maintained, the references are given chronologically.

(over)

 ABSTRACTER: F. Bruce Sanford

2.12 PRELIMINARY REPORT ON EXPLORATORY LONG-LINE FISHING FOR TUNA IN THE GULF OF MEXICO AND THE CARIBBEAN SEA. PART I. EXPLORATORY TUNA FISHING BY THE OREGON

Bullis, Harvey R. (Fish and Wildlife Service, Pascagoula, Mississippi)
Commercial Fisheries Review 17, 1-15 (October 1955)

Concurrently with other explorations in the Gulf of Mexico, chiefly for shrimp, the U. S. Fish and Wildlife Service has been engaged since 1952 in a program of tuna exploration. This is an interim report as the exploratory work is being continued.

Before the exploratory fishing program was started in the Gulf there was little information available to suggest the existence of fishable tuna stocks. Observations made from the Oregon during the summers of 1950 and 1951 provided a basis for an active exploratory tuna fishing program.

A two-phase program was begun in 1952 to expand the knowledge of the Gulf-tuna potential and to furnish information on applicable gear and fishing methods. Phase one had two principal objectives: to determine the species present in commercial quantities; and to employ fishing techniques as suggested by the observed behavior of the tuna schools. To achieve these objectives, one year (May to October) of part-time fishing effort was devoted to each of the three major commercial tuna-fishing methods; purse seining, live-bait fishing, and long-lining. The second phase was to be dependent on the results of the first phase with a basic objective of year-round application of the gear found to be most successful.

In general, the results from the first two years of part-time work (1952-1953) using purse seines and live-bait techniques were inconclusive. Several factors including weather conditions and the speed of fish movement hampered purse seining. Live-bait fishing was slightly more successful. Baiting operations with a trap lift net (Seibenaler 1953) in the south, east and north Gulf demonstrated a readily-available supply of tuna bait. Further work using the live-bait pole- and line-fishing technique is scheduled for the future.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

2.111 TESTS ON KURALON TWINE

Carrothers, P. J. (Pacific Fisheries Experimental Station)
Western Fisheries 50, 26 (September 1955)

As part of an investigation on properties, specifications, and treatment of fishing gear materials for nets and lines, the following data on the Japanese synthetic fibre Kuralon have been determined at this Station.

TABLE I—Weight and tensile strength of Kuralon and cotton twines.

	Kuralon staple twine				
Twine size	20/9	20/12	20/18	20/24	20/30
Yards per pound	1400	1100	740	550	440
Tensile strength (pounds)—					
Dry: straight twine	17	22½	34	45½	57
single knot	6	8	12	16	20
Wet: straight twine	13½	17½	26½	35½	44½
single knot	6	7½	11½	15½	19½

	Corresponding medium-laid cotton twines			
Twine Size	6-thread	9-thread	12-thread	15-thread
Yards per pound	1190	750	560	425
Tensile strength (pounds)—				
Dry: strength twine	11½	17	22	27½
single knot	9½	13½	17½	20½
Wet: straight twine	14	21	27	33½
single knot	13	19	23½	26

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2.1123 PRELIMINARY REPORT ON EXPLORATORY LONG-LINE FISHING FOR TUNA IN THE GULF OF MEXICO AND THE CARIBBEAN SEA. PART II. LONG-LINE GEAR USED IN YELLOWFIN TUNA EXPLORATION

Captiva, Francis J. (Exploratory Fishing and Gear Development Section, Fish and Wildlife Service, Pascagoula, Mississippi)
Commercial Fisheries Review 17, 16-20 (October 1955)

The long-line gear used on the Oregon for the capture of deep-swimming tunas is essentially the same as that used by Japanese fishermen in the Pacific Ocean. Long-line gear consists of three basic components: the mainline, the branch lines (gangions), and the buoys with buoy lines. The basic unit of long-line gear is the "basket" which contains a section of mainline and the attached branch lines.

Due to the considerable stress that is exerted on the mainline and branch lines during fishing operations, it is necessary to use strong enough line to prevent the gear from parting. Completely satisfactory results were obtained on the Oregon only when 1,000-pound test line was used. Lines of many different materials were used, most of which performed satisfactorily. The best of those tried to date was 132-thread type-E filament nylon, because of its high tensile strength, resistance to deterioration, and qualities of stiffness and size that have worked well in the long-line hauler.

Tangled lines often slow down fishing operations. The most frequently encountered tangle, known as a "wrap-around", occurs when a branch line wraps around the mainline. These are caused in several ways. One method for reducing the number of wrap-arounds is the use of swivelled beckets in the mainline

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 ABSTRACTER: Kathryn L. Osterhaug

UNKNOWN GROWTH FACTORS

KURALON TWINE

EXPLORATION FOR TUNA

LONG-LINING FOR TUNA

2.111

All tests were performed by the Station laboratory's usual procedures. The data for cotton twine are the results of similar tests applied at the same time to medium-laid cotton seine twine.

Straight, dry Kuralon twine is about twice as strong as cotton twine; but the wet, single knot strength of Kuralon is about two-thirds that of cotton. This results from the facts that the knot efficiency of Kuralon is much lower than that of cotton and that Kuralon is weaker when wet than when dry, whereas cotton is stronger wet than dry.

Kuralon is a synthetic polyvinyl alcohol fibre and hence should not be subject to rot by fish slime. It should, therefore, give better service through the fishing season than untreated cotton twine, particularly if the cotton is not protected by "bluestoning."

The relatively large stretch of wet cotton at rupture is chiefly caused by the shrinkage which occurs during wetting. It is therefore expected that Kuralon could be used to hang nets in much the same way as is cotton.

TABLE 11--Comparable properties of Kuralon and cotton.

	Kuralon	Cotton
Tenacity (1000 yards)—		
Dry: straight twine	25	12
single knot	9	9½
Wet: straight twine	19½	15
single knot	8½	12½
Knot efficiency (per cent)—		
Dry	35	75
Wet	45	85
Strength change during wetting—		
Straight twine	25% loss	25% gain
Knot	5% loss	35% gain
Stretch at break (per cent)—		
Dry: straight twine	19½	17
single knot	10	14
Wet: straight twine	22	31
single knot	15½	30½

0.7

The table of contents lists the following subjects: "Animal Protein Factor," Vitamin B_{12}, Antibiotics, Methods of Assay, and Unidentified Growth Factors.

2.1123 (Cross Reference: 1.10)

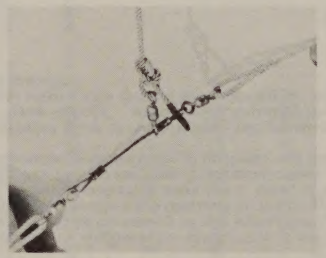

Figure 27 -- The swivelled becket used for spacing branch lines on the mainline.

Figure 32 -- Close-up of the detachable "pigtail" used to connect the branch line to the mainline. This is being used on the reel-type line hauler. The "pigtail" was designed by Ben Sholtes of Pascagoula, Mississippi.

2.12 (Cross Reference: 1.10)

Long-line fishing.--The first catches of commercial promise were made in May 1954 using Japanese long-line gear. During the year, morning, afternoon, and night sets were tried. The best catches resulted from morning fishing.

A large variety of potential bait species were tried. Squid was found to yield poorer catches than fish bait.

As yet no commercial boat has fished the Gulf with a full complement of long-line gear. The overall catch rate during the past year was approximately 1.2 yellowfin per 100 hooks. The best fishing to date was in the north central Gulf beyond the 1,000-fathom curve where the catch averaged about 2.7 fish per 100 hooks.

Figure 1 -- Baiting the long-line gear prior to setting. Both woven bamboo baskets and galvanized-metal tubs are used to store the gear.

Figure 14 -- Part of a catch of yellowfin tuna and marlin.

2.1121 CANADIAN MID-WATER HERRING TRAWL (1)

Barraclough, W. E. and Johnson, W. W. (Research Board of Canada Pacific Biological Station, Nanaimo, B. C., Canada)
World Fishing 4, 20-24 (August 1955)

Since about 1950 diversified attempts have been made to employ the mid-water trawl for capturing herring in British Columbia. In the spring of 1953 several boats, using a modified version of the Danish Larsen trawl, made successful catches of herring, however, their efforts during the autumn months were a complete failure. At this time the fishermen requested the assistance of the Fisheries Research Board of Canada in the development of the mid-water trawl. Opinions expressed by fishermen centered chiefly on two important features; namely, a net of larger proportions than that used previously, also, means to prevent or minimize scaring the herring schools by the otter-boards in front of the mouth of the net.

In the attempt to overcome these two main obstacles, a nylon net was constructed; also curved otter-boards, suspended from steel wire pennants, were developed to spread the mouth of the net. The choice of nylon twine for net construction was made because of its strength in relation to its size in contrast to the cotton twine (No. 30 cotton forward sections, No. 15 cotton cod-end) it replaced. As an example No. 93 nylon thread which has a diameter about equal to No. 9 thread cotton has a breaking strain about equal to No. 42 thread cotton. Nylon twine has less water absorption, is smoother, stays cleaner and has less resistance through the water than cotton. These factors make it possible for a boat of moderate horsepower to successfully handle a much larger net than had been previously feasible.

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 ABSTRACTER: Harold C. Johnson

2.115 GERMAN FISHING VESSEL CONSTRUCTION COSTS CUT BY PREFABRICATION

Anonymous
Fishing Gazette 72, 52 (December 1955)

Prefabrication, standardization, and welding in the construction of fishing vessels makes it possible for West German shipyards to build fishing vessels cheaper than British shipyards.

A representative of "The Fishing News," a British fishery periodical, toured most of the shipyards in Hamburg and Bremerhaven to find out why German shipyards were able to underbid British shipyards.

In one German shipyard, trawlers are almost 100 percent welded and it is only the largest ships that have any mechanical riveting.

A practice of interest to the British representative was prefabrication. He was shown prefabricated sections including a wheelhouse and a main deck. Almost every part of a trawler is prefabricated and then simply assembled on the stocks by cranes. This utilizes labor more efficiently and saves manhours.

Standardization, the representative felt, is the most important factor that gives the German shipyards an advantage over the British. In addition to the economy in manhours achieved by standardization the German shipyards are also able to offer guaranteed delivery dates coupled with firm prices.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

2.113 THE PROTECTION OF STRUCTURAL STEEL

Dechaux, G. (Societe des Peintures Astral-Cellulo, Paris)
Chemistry and Industry, pp. 1535-1541 (November 26, 1955) (London)

Corrosion of painted structures.--Painted steel exposed to sea water involves the formation of acidic and alkaline regions in the pores at the anodic and cathodic regions respectively. At the anode the iron is oxidized to ferrous hydroxide giving an acidic solution. In contact with sea water further oxidation gives ferric oxide hydrate with some black magnetic oxide hydrate. The rate of formation depends on the pH and rH ratios and is called the "oxidizing power" of the solution. Certain pigments tend to inhibit this power by increasing passivation of the metal. Oxidation is promoted by alkalization which can be controlled by pigments which give precipitated hydroxides.

Formulation of anticorrosive paints.--The final coat, in contact with the elements, must satisfy requirements regarding color, reflecting power, growth prevention, and resistance to wear and tear. Permeability is important from the standpoint of corrosion. It varies with the following factors: (1) coating thickness; (2) nature of pigment; (3) volume ratio of pigment to binder; (4) reactions between pigment and binder. The anodic inhibiting pigments must have oxidizing properties, form alkaline aqueous solutions, and have a low solubility. The binder must be permeable to these oxidizing and alkalizing ions. The amount of ions is important since a quantity too small to provide inhibition aggravates the corrosion. Oxidizing agents most frequently used are chromates, phosphates, and plumbates whose solutions are usually alkaline. The cations chosen are those that will decrease depolarizing action of the oxidizers at the cathodic pores by inducing clogging of pores through the formation of precipitates.

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 ABSTRACTER: Claude E. Thurston

2.12 NORTH PACIFIC EXPLORATORY FISHERY PROGRAM

Anonymous
Commercial Fisheries Review 17, 60 (October 1955)

Salmon caught in Gulf of Alaska by "John N. Cobb" (Cruise 28):

Salmon were caught at every station fished by the Service's exploratory vessel John N. Cobb in the offshore waters of the Gulf of Alaska and adjacent areas of the North Pacific. A total of 50 gill-net sets showed that salmon were widely distributed on the high seas from off northern Vancouver Island to Dutch Harbor, Alaska, during the 12-weeks' cruise that began on June 23 and ended September 18, 1955.

Results of the exploratory fishing yielded valuable new information on the offshore distribution, abundance, and availability of salmon to certain types of gear. All fishing was carried out from 50 to 300 miles offshore, and a few stations were fished a second time after an interval of about two months to compare catch results at different times. All five species of Pacific salmon were caught in a number of the gill-net sets, other sets produced from 1 to 4 species. Chum salmon were most abundant in the overall catch, with king salmon least numerous.

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MID-WATER HERRING TRAWL

PAINT FOR VESSEL HULLS

VESSEL CONSTRUCTION COSTS

EXPLORATION FOR SALMON

2.113

Appraisal of efficiency of anticorrosive paints. --Durability of a coating is defined as the time during which it retains all of its properties above a specified minimum grading. A comparison of evaluation methods is graphically shown. Frequent tests are necessary to get accurate data and this requires a large number of testing panels.

The method of surface preparation chosen should be determined by the cost per unit area prepared and is illustrated on a graphic basis. A specific case of wirebrushing compared to sandblasting is described. In a similar manner methods of choosing the antirust or priming coat are given. A combination of red lead and iron oxide is compared with iron oxide alone. Graphs show that a combination of red lead and iron oxide is more economical than iron oxide alone. Calculations are also shown where the surface preparation and nature of the paint vary together, thus making the method both flexible and versatile.

Illustrative material. --Two diagrams and three pictures of treated surfaces are given to augment and simplify the theory set forth. Quantitative data are obtained from six graphs dealing primarily with comparative costs.

2.12

2.1121

The body of the net was built in three tapering sections. The first, and widest part of the net was constructed of 5-inch No. 93-thread nylon. Each of the four equal pieces measured 300 meshes along the front edge. The sides, 50 meshes long, were cut on a 4-bar 1-mesh taper making the back edge of each piece 234 meshes wide. These four parts were laced together taking three meshes on each side to form the seam. The second section was of 4 1/2-inch mesh No. 93-thread nylon. Each of the four pieces were 275 meshes on the front edge with 75 along the side. Cut on the same taper and laced in the same manner as the first section, left the back edge with 175 meshes for each piece. The two sections were joined mesh for mesh, but it was necessary to take an extra 4 1/2-inch mesh on every fifth one of 5 inch. The third section of the net was of 3 1/2-inch mesh No. 93 thread nylon with each of the four sides having 212 meshes along the front edge and cut 100 meshes along the side with the same 4-bar 1-mesh taper, leaving 78 meshes along the back edges. When laced together this section was joined to the second section mesh for mesh, however, with every fifth mesh at 4 1/2 inch two meshes of 3 1/2 inch were taken in. Doubled nylon twine (No. 93 thread) was used to sew the sections together in order to prevent the knots from sliding.

All six sections of the cod-end was of 1 1/4-inch web No. 63 thread nylon and each 100 meshes long. The first section was 200 meshes wide on the front edge. Using a 4-mesh 1-bar taper left 178 meshes on the back edge of each piece. Having the same mesh size the next three sections were cut on the same taper and when laced joined together mesh for mesh. The last two sections were cut without taper to form a box-like part and were sewn mesh for mesh to the fourth tapered section.

Preliminary fishing results with this net were very effective at night just as the herring were rising off the bottom and during the period just before daybreak as the herring were descending. Daylight catches were much lighter; however, two daylight drags on large concentrations of herring at depths between 45 and 50 fathoms yielded good catches.

2.115

One famous yard has two standard designs -- a German hull and an English hull. German trawlers are usually broader in the beam and of slower speed than British vessels. They have other advantages, however, as they are able to fish in weather that would debar narrower, faster vessels.

Every trawler destined for Britain is virtually the same. The hull design is exactly the same and it is only in such matters as auxiliary machinery and accommodations that they differ.

General building costs in Germany for materials and machinery are much the same as in Britain so it is only in the field of labor costs that money is saved.

2.115 EIGHTY-THREE-FOOT STEEL SCALLOPER DESIGN WITH "THERMO HOLD"

Anonymous
National Fisherman 36, 21, 22 (November 1955)

Plans for an 83-foot steel scallop vessel to be built in Warren, Rhode Island include a removable insulated fish hold. Built on the same principle as a thermos bottle, the new type hold is designed to prevent loss of insulation with the resultant increase in ice consumption as well as to eliminate fouling caused by melting ice and fish gurry.

The watertight, steel hold within a hold (16' x 17' x 8'6" deep) fits securely inside the vessel's true hull, and is bolted to the deck through an overlapping flange and watertight gasket.

The exterior sides, ends, and bottom of the hold are sheathed in a four-inch layer of cork or foam-type insulation secured by wooden battens. The inside of the hold and pen board stanchions are zinc metallized. A drain is provided at the after end of the hold to drain melted ice and gurry to a catch basin which can be pumped out by the bilge pump. Hatches arranged in the conventional fore-and-aft way provide access to the hold from the deck. Pad eyes set in the top of the hold at each corner are provided for lifting out the hold for cleaning ashore.

See drawing (over).

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 ABSTRACTER: Kathryn L. Osterhaug

2.118 RECENT DEVELOPMENTS IN THE FREEZING OF FISH AT SEA
I. ENGINEERING ASPECTS

Eddie, G. C. (Torry Research Station, Aberdeen, Scotland)
Chemistry and Industry No. 40, 1248-1252 (October 1955)

Three vessel projects for freezing fish at sea are currently in operation.

The first vessel project is the trawler Delaware of the U. S. Fish and Wildlife Service. She is a typical New England trawler about 140 feet in length and converted to freeze a large proportion of the catch whole but after gutting, for subsequent thawing, filleting and refreezing.

The second vessel project is the factory trawler Fairtry of Leith. This vessel, the largest trawler in the world, is about 240 feet in length and specially designed to freeze its entire catch as fillets mostly for sale under a broker's label. Normally, however, its landings will also include a quantity of whole fish.

The third vessel project is a joint venture under the White Fish Authority, the Humber Trawl-owners, and the Ministry of Agriculture and Fisheries, with technical supervision by the Department of Scientific and Industrial Research. The Northern Wave, an existing Arctic trawler, about 180 feet in length, is to be converted to freeze the early part of its catch.

As fitted for freezing the Delaware has an estimated capacity of about 65 tons of fish of which nearly 60 tons will be frozen at the rate of 1/2 ton per hour. The Northern Wave on the other hand will carry from 150 to 200 tons of fish, depending on methods of stowage, of which only 30 tons will be frozen at the rate of 1/4 ton per hour. The catching rates differ in such a way that to freeze the

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 ABSTRACTER: Martin Heerdt

2.118 NEW FREEZER TRAWLER CALLED SUPER SHRIMPER

Anonymous
Southern Fisherman 15, 53, 56-57, 61, 63-64 (November 1955)

The 97-foot factory ship shrimp-trawler, Combat is designed to go anywhere and to remain at sea for unlimited periods. The Combat is a converted minesweeper powered with a 585-hp. diesel motor that propels it at an average speed of 13 knots at 1000 r. p. m.

Designed as a factory ship with the ability to freeze up to 70,000 pounds of shrimp at sea, the Combat is equipped with a hydro-freeze system that has a capacity of 1000 pounds an hour. The Combat has the ability to operate without bases on shore and is rigged for long voyages in search of shrimp.

The Combat is set up to pull two trawls simultaneously. Two hundred fathoms of 5/8-inch steel cable on each of two drums equips each trawl for work in deep water.

The shrimp produced and packed on the Combat are individually frozen. After catching and washing, the shrimp go into a chute that carries them straight to the conveyor where they are frozen and glazed. One man handles the job of feeding to the conveyors, while another takes care of the cartons as they are filled at the other end.

The solution in which the shrimp are frozen, chilled to zero in a separate chiller tank, is pumped to the conveyor and circulates continuously during the freezing process. Shrimp can be frozen and packaged within 20 minutes after going into the chute.

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 ABSTRACTER: Kathryn L. Osterhaug

2.3 DANISH FIRM INTRODUCES NEW FILLETING MACHINE

Anonymous
Western Fisheries 50, 50, 53 (September 1955)

A new type of filleting machine made for filleting deheaded and gutted cod and other fish of similar structure has been placed on the market by a Copenhagen company.

According to the manufacturer, only one person is required to operate the machine. No sorting of fish is required within the size ranges indicated for the particular size of machine used, and it makes no difference whether the fish is in rigor mortis or soft. Fillets are cut cleanly from the backbone of the fish, even in the angle between the backbone and belly bones. A stepless variator makes it possible to adjust the speed of the machine without stopping.

The small-size model of the machine handles deheaded and gutted fish approximately 1 to 7 1/2 pounds and fillets 12 to 20 fish per minute. This unit weighs 3400 pounds, is powered by a 3 hp. motor. The large-size machine handles deheaded and gutted fish approximately 6 to 15 pounds, and fillets 12 to 15 fish per minute.

The cleaned and deheaded fish is placed on "saddles". A chain-link conveyor introduces the saddles with the fish between a pair of guides leading to the rotating cutters. The cutters automatically cut out the fillets close to the backbone. The fillets are then cut free by two fixed knives and drop down on belt conveyors on each side of the machine. The carcass or waste is collected behind the machine in a box or may be removed by means of a third conveyor belt. All sizes of fish between the weight indicated for the particular size of machine used can be filleted without adjustment. During operation, the cutters are cleaned by a pressure spray of fresh water. The rotating cutters are

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REMOVABLE FISH HOLD

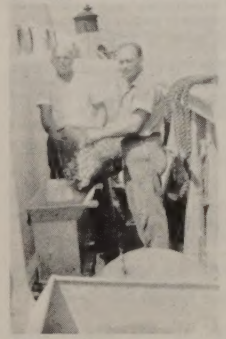
NEW FREEZER TRAWLER

FREEZING FISH AT SEA

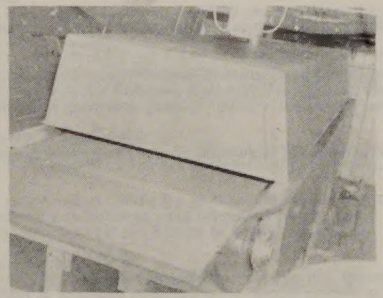
NEW FILLETING MACHINE

2.118 (Cross Reference 1.85)

The holding room measures 20 by 28 feet and can hold 700 boxes of shrimp at -20° F. The room is insulated with ten inches of foam-type insulation and refrigerated with six banks of plates. Two 20-hp. diesel motors operate the freezing compressors and two 10-hp. diesels take care of the holding room compressors.



After washing in the tank, shrimp are then transferred to the chute which is directly behind the wash tank.

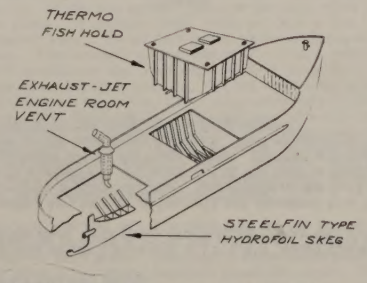


A close-up of the conveyor which moves the shrimp through the solution and freezes them in twenty minutes.

2.3

shielded and equipped with a safety bar in front of the cutters. A light pressure on the safety bar breaks the current to the motor and stops the machine.

2.115



Drawing of 83-foot steel scalloper showing the removable fish hold, exhaust-induced engine room ventilation system and the Steelfin Skeg .

2.118

same proportion of the catch on the Northern Wave would require a freezing rate of about 3/4 ton per hour. Atlantic cod are small enough to freeze in 1 to 3 hours, whereas Arctic cod are of such a size that 4 1/2 hours is required. The Delaware freezes the fish individually by direct immersion in sodium chloride brine, which is a very rapid method. Aboard the Northern Wave the freezing time is the same regardless of fish size since the plate freezer produces slabs of a given thickness. Brine immersion causes damage to visual appearance and can also affect flavor. Its use is possible on the Delaware because the fish are to be sold eventually as re-frozen skinned fillets. Such treatment is not possible aboard the Northern Wave where the fish are intended to be marketed whole and subsequently sold in all the familiar forms. The freezing installation on the Northern Wave consists of two independent banks of four, six-station plate freezers with associated cold stores, compressors, hot-gas pumps, controls, and generating sets.

Some years ago proposals for freezing Arctic cod were criticized by owners and fishery scientists on the ground that the catching rates were too high. While peaks of over 5 tons per hour do occur, voyages average from 1 ton per hour to less than 1/2 ton per hour, with the catching rate fluctuating violently. With a three-day permissible delay before freezing the capacity required is about 3/4 ton per hour as stated.

When freezing smaller quantities, as on the Northern Wave, the fish on board are dumped when the 3-day permissible delay before freezing is about to be exceeded. It is then necessary to catch fresh fish before starting the processing line again. It is also possible to determine in advance the number of days' catch that can be frozen, the possible number of extra days' fishing, and the quantity to be rehandled out of crushed ice for the freezer.

2.14 NEW PUMP SUCKS SARDINES FROM CALIFORNIA PURSE SEINE WITHOUT DAMAGING FISH

Anonymous
National Fisherman 36, 16 (November 1955)

A new fish pump that is actually a more efficient and compact version of the unloading pump used in recent years by Terminal Island canneries has been developed by a Comption, California man. It is claimed that the pump will eliminate hand bailing of sardines from purse nets and that it will not damage the fish.

The new suction pump is 32 inches in diameter, stands about 4 feet high, and weights about 700 pounds.

The pump works by sucking two tons of water and sardines out of the ocean every minute, rushing the mixture through an 8-inch rubber hose, through automatic valves in the pump, and through another length of hose into the hold of the boat for storage. It is claimed that the capacity of the pump can be increased to seven and one-half tons a minute by increasing the horsepower of the pump motor.

See photograph, over.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

3.19 EFFECT OF IRRADIATION ON MEAT FATS

Sribney, Michael; Lewis, U. J. and Schweigert, B. S. (Division of Biochemistry and Nutrition, American Meat Institute Foundation, and Department of Biochemistry, The University of Chicago) Journal of Agricultural and Food Chemistry 3, 958-960 (November 1955)

An investigation was made of the chemical changes that occur in rendered and nonrendered beef and pork fats during irradiation with gamma rays and subsequent storage. In general, increases in peroxides, carboxyl compounds, or free fatty acids were small in beef and pork fat irradiated at 2 or 4 x 10^6 rep when a minimum amount of oxygen was present.

A marked increase in peroxide values was observed when irradiated fats were stored at 5° C. in an oxygen-permeable casing as compared to nonirradiated samples in oxygen-impermeable casing or in sealed cans.

A lower peroxide value was observed when treatment at 4 x 10^6 rep was used as compared to 2 x 10^6 rep for nonrendered fats irradiated in cans. Peroxide values for both dosage treatments decreased and the free fatty acids increased during storage of samples in cans at 24° C.

See tables I and II, over.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

2.3 "BLACK LIGHT" USED TO INSPECT SHRIMP

Anonymous
Southern Fisherman 15, 35 (November 1955)

Ultraviolet light is being used by a shellfish company in Harvey, Louisiana as an aid in inspecting peeled shrimp. After the shrimp have passed through the peeling machines, some shell fragments still stick to the cooked meats and are difficult to detect by visual inspection with ordinary light.

After installing a bank of ultraviolet tubes over the inspection conveyor it was found that the remaining bits of shell were easily removed as they fluoresced while the meats did not.

Since the ultraviolet light is not visible to the eye, the inspection is carried on in a darkened room. When the ultraviolet light strikes the shell fragments, it is converted to visible light and the shell fluoresces.

This inspection technique is said to save considerable time and enables the company to maintain closer quality control over its shrimp.

 ABSTRACTER: Kathryn L. Osterhaug

3.19 RESISTANCE TO IRRADIATION

Anonymous
Food Manufacture 30, 485 (December 1955)

Irradiation problems were among the subjects investigated by the American Meat Institute Foundation and recorded in the Annual Report for 1953-54. The studies, which were aided by contracts from the Atomic Energy Commission and the Quartermaster Corps of the U. S. Army, were made on radiation with low dosage gamma rays on meat at temperatures near freezing and the effect of gamma irradiation on nitrogenous compounds, proteolytic enzymes, flavor, odor, pigments and fats in meat.

The group of bacteria responsible for the spoilage of irradiated meats are described for the first time by Felton et al, who investigated the radiation sensitivity of spoilage micro-organisms with respect to the keeping quality of meat. The spoilage of irradiated meats, first marked by a sour smell, is due to organisms which are large, non-motile, non-sporeforming, Gram-positive rods that are catalase-positive, facultative and psychrophilic. These bacteria are very resistant to radiation as compared to the pseudomonads. Their mean lethal dose is in the order of 30,000 rep under conditions where the comparable dose for the pseudomonads is about 3,000 rep. The investigators also determined the radiation resistance of some of the micrococci, lactic acid bacteria and yeasts which limit the shelf life of cured meats. Micrococci, including food poisoning staphylococci, have a mean lethal dose of about 15,000 rep. The dose for greening lactobacilli was found to be between 12,000 and 15,000 rep.

In marked contrast to the results previously reported for the pseudomonads, no appreciable difference in radio-resistance of a staphylococcus or a lactobacillus was observed for populations ranging from 3 x 10^5 to 3 x 10^8 cells per ml.

 Reprinted in whole

FISH PUMP FOR SARDINES

INSPECTING COOKED SHRIMP

RADIATION STERILIZATION

IRRADIATION RESISTANT BACTERIA

2.3 (Cross Reference: 1.85)

2.14

Fish pump on vessel

3.19

3.19 (Cross Reference: 4.5)

Table I. Effect of Irradiation and Subsequent Storage on Peroxide Values of Nonrendered Beef Fat

(2.1 × 10⁶ rep. treatment, cobalt-60 source, University of Chicago. Storage tests conducted at 5° C. for 4 weeks. Peroxide values expressed as milliequivalents per kilogram of fat)

	Characteristics of Fat			Non-irradiated	Irradiated		Non-irradiated, Stored	Irradiated and Stored	
	Fat, %	H_2O, %	IV[a]		Saran casing	Visking casing		Saran casing	Visking casing
Sample A	82.3	8.5	48	0.1	0.3	1.9	...	...	...
				0.2	1.3	3.1			
				0.5	0.9	4.1			
Sample B	87.2	7.7	45.2	0.5	1.6	...	0.6	2.6	...
Sample C	86.0	8.1	46.8	0.5	1.6	...	0.5	2.0	...
Sample D	72.0	9.8	46.9	0.4	...	2.0	0.4	...	18.7
Sample E	90.0	5.8	46.4	0.6	...	2.1	0.3	...	21.3

[a] IV, iodine value.

Table II. Effect of Irradiation and Subsequent Storage on Peroxide Values of Rendered Beef and Nonrendered Pork Fat

(2.0 × 10⁶ rep treatment, cobalt-60 source, University of Chicago. Storage tests conducted at 5° C. for 4 weeks. Peroxide values expressed as milliequivalents per kilogram of fat)

	Characteristics of Fat			Non-irradiated	Irradiated		Non-irradiated, Stored	Irradiated and Stored	
	Fat, %	H_2O, %	IV		Saran casing	Visking casing		Saran casing	Visking casing
Rendered beef fat	...	...	48.7	0.4	3.4	...	0.5[a]	2.0	...
				0.4	2.6	...	0.3[a]	2.7	...
				0.4	...	3.0	0.3	...	11.0
				0.4	...	2.1	0.5	...	5.3
Pork fat	80.0	6.3	54.5	0.3	1.6	1.8	0.8[a]	2.5	...
				0.4	1.7	1.9	0.8	...	3.5

[a] Saran casing; for all others Visking casing was used.

3.19 FOOD STERILIZATION METHODS -- THE FUTURE

Ball, C. Olin (New Brunswick, New Jersey)
Food Technology 9, 588-590 (November 1955)

Sterilization with heat.--There are a number of reasons why heat will continue indefinitely to be the most effective and most suitable lethal agent for use in the sterilization of foods, regardless of what the future may reveal in the way of "cold" sterilization. These reasons are as follows:

Reasons for continued use of heat sterilization.--Heat produces caramelization effects upon organoleptic quality. These effects are far less offensive to the palate than the effects of ionizing rays. Furthermore, the caramelizing effects of heat are definitely known to be non-injurious to health, whereas the decomposition effects of ionizing rays upon foods are not known to be non-injurious to health.

By choosing the optimum processing temperature and time, the caramelization effects of a quantity of heat adequate for sterilization can be minimized to such an extent that the resulting sterilized food has essentially the quality of freshly cooked food for the table. This freshly cooked quality of canned sterilized food product can be preserved for any reasonable period of storage up to 2 or 3 years if the food is held at 32 to 36° F.

Present day knowledge of the perishability of foods in storage definitely indicates that it is naive to believe that foods sterilized by "cold" ray treatment will not require cold storage to preserve their quality.

Almost 15 years of intensive research have been directed toward preventing serious degradation of the organoleptic quality of foods that have been subjected to ionizing ray treatment without any

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 ABSTRACTER: Martin Heerdt

3.230 BRINE DIPPING OF HADDOCK FILLETS

Holston, J. and Pottinger, S. R. (Fishery Technological Laboratory, U. S. Fish and Wildlife Service, East Boston, Massachusetts)
Commercial Fisheries Review 17, 21-30 (October 1955)

The brining of fillets before freezing is an established practice of the fish processing industry. The purposes of brining are threefold: (1) to wash the fillets, (2) to decrease free drip from thawed fillets, and (3) to give the fillets a pleasing salt flavor.

To study the effects of brine dipping upon fillets from iced fish and from those prepared from fish brine-frozen at sea, an investigation was started on this phase of commerical fish processing. The work was restricted to studies on fillets of haddock and scrod haddock. The specific objectives were to:

1. Determine the factors affecting weight change and salt uptake by fillets during the brine dipping process.
2. Determine the effect of brine dipping upon free drip and press drip of fillets.
3. Determine the salt content producing the most nearly optimum saline palatability of the fillets.
4. Determine the effect of brine dipping on the quality and the palatability of the fillets prepared from brine-frozen round fish.
5. Prepare recommendations for brine-dipping procedures for use in the commercial production of fillets from iced fish and from fish frozen in-the-round at sea.

It was found that fillets dipped in water or in various strengths of brine increased in weight. The major factors affecting the degree of increase were: (1) immersion time, (2) available surface area per unit of weight, and (3) brine strength. Salt uptake by the fillets was directly related to the strength

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 ABSTRACTER: Kathryn L. Osterhaug

3.237 FISH STICKS BY MODERN METHODS

Anonymous
Fishing Gazette 72, 38, 39, 42 (December 1955)

A Gloucester fish plant is installing a 250-foot processing line for cooked fish sticks. The plant layout is in the shape of a huge "S" in order to fit it into the existing building.

The plant is designed for cleanliness, attractiveness, and ease of upkeep. The ceiling is of white plastic, the floor of deep green composition, and the walls of a lighter green cement enamel. The cement enamel is waterproof, not affected by extremes in temperature, easily washed, and decorative. Cement enamel finish eliminates all open joints and produces a uniform, sanitary, permanent surface that requires no maintenance other than washing with soap and water. All of the equipment is made of stainless steel and white enamel.

After the frozen fish blocks are cut into the required size slabs on butchers' saws, the operation is completely mechanical. The slabs of frozen fish are precision cut into uniform sticks by a cutter that employs a lateral downward motion of the blade producing a shear action rather than a straight guillotine performance. The cutting machine is adjustable so that it can handle a variety of fish block sizes or cut any size stick to match any desired number of sticks to a given package weight. It can also be adjusted to cut cubes, tidbits, fish steaks, or fish portions.

The cutting operation is done without waste of sawdust. The blocks go into the cutter at one end and come out as sticks on the other without a drop (eliminating possible breakage or damage to sticks), completely separated. They are conducted by the automatic discharge belt to the batter and breading machines. Anywhere from 576 to 864 sticks are delivered per minute.

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 ABSTRACTER: Kathryn L. Osterhaug

3.238 WRAPPING MATERIALS FOR FROZEN FISH

Heerdt, Martin (Fishery Technological Laboratory, Seattle, Washington)
Industrial Refrigeration 129, 60 (September 1955)

Many wrapping materials that are completely satisfactory in preventing desiccation of frozen fish products during storage do not furnish acceptable resistance to the penetration of air from the outside. Atmospheric oxygen causes the loss of fresh flavor, the development of rancidity, the bleaching or fading of natural color, and the development of colors foreign to the fish. To minimize these deleterious effects, contact with oxygen must be avoided; for even the amount of air often inadvertently included at the time of packaging contains enough oxygen to start these oxidative changes.

Experiments at the Seattle Laboratory of the Fish and Wildlife Service strikingly demonstrated the inadequacy of ordinary moisture-vapor-proof films in keeping air away from frozen fish fillets and steaks that have been wrapped according to present practice. Two methods were employed in packaging duplicate lots of fish. The first, or conventional method, consisted of wrapping the fillets or steaks in moisture-vapor-resistant film. The second consisted of vacuum packing the fillets in hermetically sealed tin cans. After being rapidly frozen and subsequently placed in cold-storage for several months, the fish that had been vacuumized and hermetically sealed in tin were in the same condition as at the time of packing, while the samples that had been wrapped in moisture-vapor-proof paper were lacking in flavor, faded, discolored, and partially rancid.

With many species of fish a tremendous decrease in quality occurred in the wrapped samples, in some cases rendering them completely inedible, in contrast to the fresh, unchanged condition of the duplicate samples packed in evacuated tins.

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 ABSTRACTER: Martin Heerdt

FUTURE OF COLD STERILIZATION METHODS

BRINE DIPPING FILLETS

MODERN FISH STICK PLANT

PACKAGING OF FROZEN FISH

3.230 (Cross Reference: 1.5)

of the brine; it was also affected by the available surface area per unit of weight, by the brine temperature, and by the immersion time.

Free drip from thawed frozen fillets is reduced to a practical minimum when from 0.8 to 1.2 percent of salt is incorporated into the fillet. Press drip is reduced only when the salt content of the fillet is 1.5 percent or greater.

Tests of the effect of increasing quantities of salt in the fillet upon palatability indicated that the optimum salinity was approximately 1.0 percent. The following immersion periods and brine strengths caused the uptake of approximately 1.0 percent of salt in the fillet and were found to be the most satisfactory in the preparation of fillets for freezing:

Large haddock fillets -- immerse for 20 seconds in a brine containing 15 percent by weight of salt.

Scrod haddock fillets -- immerse for 20 seconds in a brine containing 10 percent by weight of salt.

Fillets of thawed brine-frozen fish -- immerse for 20 seconds in a brine containing 6 to 8 percent by weight of salt.

Figure 1 - Scaling and filleting scrod haddock for brine-dipping experiments.

Figure 5 - Preparation of fillets for organoleptic tests.

3.238

Although such a packaging method would undoubtedly keep fish in an excellent condition over a long period of time, there may be danger that if frozen fish were packed in ordinary tin cans, consumers or dealers might store the cans at room temperatures regardless of any printed cautions. Under such conditions, frozen foods would defrost and spoil rapidly; and when hermetically sealed, defrosted canned foods possess all of the requirements for the growth of Clostridium botulinum with consequent toxin production. The findings should serve to emphasize the importance of the selection of packages, films, or wraps that are not only moisture- and vapor-proof but that also resist atmospheric oxygen.

3.19 (Cross Reference 3.33)

recognizable progress having been made. It would seem, therefore, that at least another 15 years of research will be required as the minimum time in which appreciable progress can possibly be made. If this optimistic estimate should prove to be sound and some cold sterilized food produced, these foods would still have to be stored under refrigeration to preserve their quality and some of the foods would still have to be cooked before they could be eaten.

Temperature of food storage rooms. --The Quartermaster report of March 1955 entitled, "Establishing optimum conditions for storage and handling of semi-perishable subsistance items", clearly points out how unrealistic it is to store sterilized or dehydrated foods at summer temperatures because of the organoleptic quality loss that occurs. Packers who refuse to store canned foods under refrigeration fail to realize that it would cost them no more than twice what it is costing them for common storage. Surveys have revealed that common storage, storage at 32 to 36° F., and storage at 0 to -15° F. average respectively, 1.05, 1.95, and 2.75 cents per pound per year.

3.237

An alignment feeder places the sticks in a uniform arrangement. This step makes it possible to take full advantage of the continuous belt area to provide maximum production and uniformity in battering, breading, frying, and cooling.

Preparation and processing of fish sticks at this plant is under the direct supervision of an experienced food technologist. Milk, eggs, seasoning, and cereals are blended in the plant to a specified formula.

The battering machine is equipped with a system for automatic mixing of the dry batter mix and for continuous control of the viscosity of the batter. The level of batter in the batter sump is automatically regulated by electronic stainless steel probes. A continuous chart of viscosity is recorded so that quality control is assured.

The battered sticks are cooked in automatic, high production, large capacity continuous cookers, thermostatically operated from a huge dual burner that is both oil and gas fired. The cookers are equipped with a constant circulating oil clarifier. As there is no flame in the cooker proper, it is impossible for the sticks to burn. The constant temperature control assures a flow of hot oil to the cooker that never varies from one end to the other.

The cooling tunnel is a stainless steel conveyor, five feet wide and sixty feet long, built in the shape of a horseshoe. Washed and purified cold air is drawn into the tunnel at both ends, spreads over the top of the hot fish sticks and is drawn downward to the base and to the open air outside the plant.

After cooling, the sticks are packed, 10 to a package, in waxed fiber packages, closed automatically and tightly overwrapped before being sent to the tunnel blast freezer. The boxes are packed in cartons and sealed after they are frozen.

3.33 EVALUATION OF CANNING PROCESSES

Evans, H. L. (Division of Food Preservation and Transport, Homebush N.S.W., Australia)
Food Preservation Quarterly 15, 45-51 (September 1955)

In the standard method for determination of the optimum processing time and temperature in the canning of a food product, the assumption is made that if safe processing conditions are employed for that portion of the can receiving the least severe heat treatment (usually the center of the can) then the process is satisfactory for the can as a whole. Recent work has indicated that this assumption is not entirely true. The newer methods of calculating thermal processing time, based on the work of Stumbo and others are discussed and formulae given. Calculation of processing times by the newer methods is of especial importance when dealing with liquid packs.

It is shown that two sets of processing conditions equivalent by the old method of calculation may not be equivalent by the newer methods.

The heat transfer through the headspace gases is much lower than through the product itself. This results in the point in the can having the slowest heating to be not at the center but slightly above it. Thus, for a 1-pound flat can (401 x 211) which is 5.5 centimeters high, the slowest heating point is 0.6 centimeters above the center. The safe heating time is reduced somewhat by this effect.

The thermocouple wire transmits heat at a rate much greater than the food. If a wire larger than No. 30 guage is used, an appreciable error will be introduced.

ABSTRACTER: Maurice E. Stansby

4.00 REPORT OF THE LITERATURE REVIEW COMMITTEE. 21ST ANNUAL REVIEW OF THE LITERATURE ON FATS, OILS, AND DETERGENTS. II.

Piskur, M. M. (Swift and Co., Chicago, Illinois)
Journal of the American Oil Chemists' Society 32, 319-341 (June 1955)

Nutrition and Biochemistry. --The fish and marine animal oils available to the Japanese were investigated for their relative nutritive value. The work of Kaneda et al. (Bull. Japan. Soc. Sci. Fisheries 14, 285; 15, 745, 17, 173; 18, 85; 19, 171, 700; 20, 50; J. Japan Soc. Food Nutr. 5, 78, Sci. Papers Inst. Phys. Chem. Res., Tokyo 44, 74; J. Biochem., Japan 41, 327) indicates that: (a) the very fresh oils are in general just as nutritious as vegetable oils; (b) due to presence of highly unsaturated acid, spontaneous oxidation readily occurs resulting in toxicity; (c) hydrogenation to eliminate polyunsaturation reduces their nutritive value; (d) polymerization or oxidation in processing is deleterious, the latter being most injurious to the nutritive value; and (e) fatty alcohol -fatty acid esters from certain whale oils are absorbed by rats but cause seborrhea. Results similar to various portions of the above list appeared also in other Japanese reports (Matsuo--J. Biochem., Japan 41, 481; Higashi et al. --Bull. Japan Soc. Sci. Fish. 19, 537; Fujii et al. --Repts. Res. Lab. Nippon Suisan Co. 6, 1, 10, 18; Kakinuma et al. --J. Japan Soc. Food Nutr. 3, 156). The lesser nutritive value of Japanese margarine as compared to butter for growth and reproduction of mice was presumed to be due to the lower contents of essential fatty acids and lecithin (Mori--Med. & Biol., Japan 27, 89).

Schurch (Problems in Nutr. Res. 1952, 146) suggested that toxicity of heat polymerized oils may be due to cyclic or branched monomers. Recent use of polymerization in processing of fish oils for edible uses together with the doubt regarding their safety has instigated development of analytical

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ABSTRACTER: Martin Heerdt

3.9 FOOD RADIATION STERILIZATION MAKES NEW ADVANCES

Pomerantz, Reuben (Quartermaster Food and Container Institute of the Armed Forces, Chicago, Illinois)
Food Processing 16, 21-23 (August 1955)

After several years of preliminary studies by a number of organizations--public, private, and academic--a practical picture of the direction in which radiation sterilization investigations are heading is beginning to appear. Although practical commercial food irradiation appears to be "several" years in the offing, there is still considerable ground work being done right now.

With the awarding of a new contract by QMC to a leading industrial concern for the study of economic and logistical feasibility of radiation food processing, the use of ionizing rays has moved another significant step forward.

Another forward stride toward actual commercial operation which is planned by the QMC will be the design and construction of a pilot plant having a capacity of around 1000 tons per month, to be in operation in 1958, according to Major General K. L. Hastings, the Quartermaster General. Based on operational experience factor of 2 years, for such a pilot plant, a commercial plant can then be designed. It is the hope of the QMC that by that time, sufficient data and interest will be developed so that the food processing companies will be operating without government subsidies.

The Quartermaster Corps, through the QM Food and Container Institute, is evolving as a major spearhead in these studies, with over 40 research groups from private industry, universities, and foundations working on projects contracted by QMC. This represents around 75 percent of all work being conducted on food irradiation problems.

Editorial summary

4.11 COMPONENT FATTY ACIDS IN BODY FATS OF SOME MARINE FISHES

Karkhanis, Y. D. and Magar, N. G. (Institute of Science, Bombay, India)
Journal of the American Oil Chemists' Society 32, 492-493 (September 1955)

This investigation included a study of the fatty acid composition of three species of fish, (1) the white pomfret (Stromateus cinerus), (2) the black pomfret (Stromateus niger), and (3) the pala (Hilsa ilsha), caught along the coast of Bombay, India.

The authors experimental procedure proceeded as follows: The muscles from freshly caught fish were autoclaved at 15 pounds pressure at 250° F. for 15 minutes, followed by ether extraction of the lipides. The oils were saponified and the mixed fatty acids were fractionated by low temperature crystallization in ether and acetone (10 ml/1 g) to obtain fractions having different iodine values. The fractions were methylated and the methyl esters in each were fractionally distilled at reduced pressures. The Hilditch procedure was followed in obtaining analytical data.

The results of these studies are summarized in the following tables:

Table 1
Some Characteristics of Body Fats of Marine Fish

Fish	Oil		Mixed Fatty Acids	
	Iodine Value (Wijs)	Saponification Equivalent	Iodine Value (Wijs)	Saponification Equivalent
White pomfret	78.3	276.1	81.1	272.5
Black pomfret	105.3	283.7	113.7	278.8
Pala	77.4	277.4	81.4	271.0

ABSTRACTER: Edward H. Gruger

MEASURING CANNING PROCESSING TIME

RADIATION STERILIZATION

REVIEW OF MARINE OIL LITERATURE

FATTY ACIDS IN FISH FLESH

3.9

4.11 (Cross Reference: 8.53)

Table 2
Composition of Body Fats of Some Marine Fish

Acids	White Pomfret		Black Pomfret		Pala	
	Wt. %	Mole %	Wt. %	Mole %	Wt. %	Mole %
Saturated						
Myristic	4.75	5.68	4.37	5.3	5.32	6.34
Palmitic	20.57	21.92	13.29	13.56	23.48	24.81
Stearic	11.15	10.69	7.26	7.01	8.87	8.49
Arachidic	---	---	0.46	0.41	0.02	0.02
Unsaturated						
Tetradecenoic (-2H)	1.40	1.69	2.44	3.02	1.29	1.55
Hexadecenoic (-2H)	9.19	9.86	18.80	19.75	6.82	7.30
Octadecenoic (-2H)	33.16	32.08	33.16	31.98	32.88	31.68
Octadecadienoic (-4H)	3.56	3.46	0.44	1.23	1.68	1.63
Octadecat rienoic (-6H)	3.62	3.55	1.73	1.74	9.67	9.45
Eicosenoic (-2H)	7.54	6.63	4.53	4.09	9.01	7.90
Eicosatetrenoic (-8H)	5.06	4.54	6.74	6.21	0.48	0.43
Docosapentaenoic (-10H)	---	---	3.39	2.89	0.48	0.40
Docosenoic (-2H)	---	---	3.39	2.81	---	---

The authors mentioned studying the ultraviolet spectra of isomerized unsaturated fractions for the purpose of investigating presence of unsaturated acids; however, no spectral data were included in the report.

It was concluded that the black pomfret oil was abnormally high in palmitoleic acid and that polyunsaturated acids were present in black and white pomfret oils but only present in traces in pala oil.

3.33 (Cross Reference: 0.6)

4.00

methods based on solubility in propyl alcohol for their detection in food fats (Hugel--Fette u. Seifen 55, 544). When it is important to differentiate between butter and hydrogenated dolphin fat, the butyric acid chromatograph is distinguished from that of the isovaleric acid of the latter fat by color produced by 0.05 percent bromophenol blue containing nitric acid (Antoniani & Cerutti--Ann. sper. agrar, Rome, 8, 801). Butter adulteration with hydrogenated dolphin oil can be detected by dissolving 5 milliliters of the fat in a mixture of 10 milliliters of chloroform and 1 miHiliter of glacial acetic acid and adding 2.5 milliliters of 10 percent bromine in chloroform (Cerutti--Ann. sper. agrar., Rome 8, 747). With pure butter the color remains yellow for 12 hours whereas dolphin fat produces a green color. Two other tests for adulteration of butter with hydrogenated dolphin fat were based on the critical temperature of solubility of the fat in nitrobenzene (Ahmad--Pakistan J. Sci. Res. 5, 35; Cadrobbi & de Francesco--Boll. lab. chim. provinciali 3, 7). A combination of one of these tests with the Bellier resorcinol reaction was recommended to increase certainty of the judgment (de Francesco--Ibid. 4, 90). The Bellier resorcin method is most certain when the butter adulterant is hydrogenated fish or marine animal oil (de Francesco--Ibid. 3, 16).

A method for detecting fish or train oils deodorized by polymerization is based on insolubility in propanol at between 5° and 20° C. (Hugel--Fette u. Seifen 55, 544). Highly unsaturated acids of 20 and more carbon atoms were isolated from seal viscera fat (Tsuchiya & Okubo--J. Chem. Soc. Japan, Ind. Chem. Sect. 56, 187), clam fat (Hori & Hosoda--J. Chem. Soc. Japan, Chem. Sect. 74, 515), liver oils of various fish (Tsuchiya--J. Chem. Soc. Japan, Ind. Chem. Sect. 55, 375; Tsuchiya & Okudo--Ibid. 804; Gupta--Proc. Natl. Inst. Sci. India 19, 527; Klenk & Bongard--Hoppe-Seyler's Z. Physiol. Chem. 292, 51), and sardine oil (Toyama & Yamamoto--J. Oil Chemists' Soc., Japan 2, 108, 147, 193, 195; Mem. Fac. Eng. Nagoya Univ. 5, 144, 122). The ether-extracted oils from cuttlefish livers of low oil content contain more unsaponifiable and a higher sterol content than commercially extracted oils (Toyama et al. --Mem. Fac. Eng. Nagoya Univ. 5, 110).

4.11 AN INVESTIGATION OF THE OIL OF LAEMONEMA MOROSUM MATSUBARA. I. RESEARCH ON THE DOCOSENOL FRACTION

Komori, Saburo and Agawa, Toshio (Osaka University, Japan)
The Journal of the American Oil Chemists' Society 32, 525-528 (October 1955)

The fish Laemonema morosum, a native of the Pacific ocean near Japan, is taken by dragging at 300-350 m. This fish is used as food and the oil from it is used in the manufacture of leather. The oil contains 31 to 34 percent of unsaponifiable matter that consists of the esters of higher alcohols and fatty acids instead of glycerides. About 50 percent of the unsaponifiable matter of this oil is a new alcohol 11-docosen-1-ol, which is a solid with a melting point of 31.5-32.2° C.

Five fish measured for this study ranged from 44 to 55 centimeters in length and from 362 to 857 grams in weight. Their livers ranged from 27 to 71 grams in weight and their viscera minus the liver ranged from 16 to 39 grams. The whole fish yielded 1 percent oil, the liver 87 percent oil, and the viscera without the liver 9 percent oil.

Oil properties.--The characteristics of the oil from Laemonema morosum are shown in table 2, over.

Fractionation of the unsaponifiable matter.--The unsaponifiable matter from oil sample number 1 was converted into the acetate and distilled. Nine fractions were obtained.

The docosenol acetate fraction.--Fractions 8 and 9 appeared on the basis of distillation temperature, saponification value, and iodine value to be docosenol acetate. Fraction 8 (140 grams) was saponified and the alcohol obtained (128 grams) was fractionally crystallized from methanol at

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 ABSTRACTER: Martin Heerdt

4.83 PANEL ON DRYING OILS. I. RESEARCH, THE KEY TO FUTURE MARKETS FOR DRYING OILS

Wilhemy, Odin and Barr, Harry W. (Battelle Memorial Institute, Columbus, Ohio)
The Journal of the American Oil Chemists' Society 32, 204 (April 1955)

Unless a significantly greater research effort is applied to the drying oils, the following trends are likely in the future:

1. The use of synthetic raw materials in the manufacture of both protective coatings and non-paint products will continue to increase at the expense of the drying oils, with a resultant continued decline in drying-oil consumption. Since expansion in the total markets for most of these products is anticipated, the decline in drying-oil consumption as a percentage of total raw-materials usage is likely to be greater than the decline in actual volume of oils consumed. Unless there is a major decline in the price of drying oils as a group relative to tall oil, consumption of tall oil and its derivatives also seems likely to increase in the future, particularly if the quality of these materials continues to improve as it has in recent years.
2. Consumption of soybean oil and soybean-oil fatty acids is likely to increase at the expense of linseed oil if soybean oil is cheaper than linseed, as it has been in past years, and if the popularity of alkyd resins continues. The market for linseed oil may see a further cutback within 10 years if the anticipated development of an exterior house paint of a non-linseed type becomes a reality.
3. In protective-coatings products average oil content will continue to decline in trade-sales and industrial-maintenance lines, but will remain relatively stable in industrial-product finishes. The net effect will be a decrease in the production of "exclusively oil" coatings, accompanied by an increase in production of both "part-oil" and "non-oil" coatings. Production of floor coverings will continue to increase, but most of the increase will be in the form of vinyl-based coverings and other types in which relatively little oil is used. On the basis of relative market size and other factors, interior flat wall

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4.7 THE FRACTIONATION OF MARINE-OIL FATTY ACIDS WITH UREA

Domart, Claude (Smith-Mundt Fellow at the University of Washington, 1952-1953); Miyauchi, D. T. and Sumerwell, Wm. N. (Fishery Technological Laboratory, U. S. Fish and Wildlife Service, Seattle, Washington)
The Journal of the American Oil Chemists' Society 32, 481-483 (September 1955)

Oils obtained from marine animals are characterized by their substantial content of long chain fatty acids having 20 to 24 carbon atoms and 3 to 6 double bonds. On the other hand, such oils also contain abundant amounts of the shorter chain, more saturated fatty acids. This broad mixture of saturated and unsaturated fatty acids in marine oils makes necessary a preliminary separation before the oils can be used for some purposes, particularly those requiring good drying properties.

The demonstration by Bengen that urea forms crystalline complexes with saturated and mono-olefinic fatty acids opens the way for the development of a simple and rapid means of concentrating the more unsaturated fatty acids found in marine oils.

The present report describes the preparation and properties of fatty acid fractions obtained by applying urea crystallization to the fatty acids prepared from a number of common marine oils. Two series of experiments were run. In the first series the fatty acids of menhaden oil were fractionated at 1° C. with different mole ratios of urea. It was found that the maximum yield of crystalline complex was obtained when the ratio was 23 moles of urea per mole of fatty acids.

In the second series of experiments fatty acids from menhaden oil, herring oil, tuna body oil, seal oil, salmon egg oil, and salmon head and viscera oil were fractionated with urea at temperatures ranging from 25° C. to -30° C. Unsaturated fatty acid fractions having iodine values ranging from 250 to 300 were obtained.

 ABSTRACTER: Wm. N. Sumerwell

4.92 THE BIOLOGICAL VALUE OF OILS AND FATS. I. GROWTH AND FOOD INTAKE ON FEEDING WITH NATURAL OILS AND FATS

Thomasson, H. J. (Unilever Research Laboratory, Zwijndrecht, Netherlands)
The Journal of Nutrition 56, 455 (August 1955)

Introduction.--The author measured rat growth on diets containing lard, summer butterfat I, summer butterfat II, winter butterfat, olive oil, cottonseed oil, beef fat, shea butter, maize oil, soybean oil, groundnut oil, palm fat, sunflowerseed oil, poppyseed oil, coconut fat, sesame oil, owalanut oil, whale oil I, whale oil II, herring oil, rapeseed oil, and kapokseed oil.

Experimental diets.--Each fat was fed at dietary levels of 10, 20, 30, 40, 50, 60, and 73 Calories percent and compared with summer butterfat fed at a dietary level of 20 Calories percent. This schedule required 8 groups of rats for each fat fed. Each group consisted of 8 to 12 male 21-day-old-Wistar-strain rats. All of the diets were prepared with equal amounts of protein (casein, 230 Calories), dried brewers' yeast (28.5 grams), and salt mixture (8.5 grams per 1000 Calories). Test fat in the diets was varied at the expense of the carbohydrate (rice) content on a calorie basis. Diets were made up twice a week. The diets and drinking water were fed ad libitum. All of the rats were fed at the beginning of the experiment and again after 4 weeks by pipette with 0.05 milliliters of a concentrate containing 2000 International Units of vitamin A, 12.5 micrograms of vitamin D_2, and 10 milligrams of tocopherol acetate, dissolved in groundnut oil. The rats were weighed each week during the course of the 6-week experiment. The amount of food supplied but not the food wasted was determined.

Results of feeding tests.--The rate of growth obtained with summer butterfats I and II remained practically unchanged as the fat content of the diet was increased with increasing fat dosages. All of the other fats except lard caused a decrease to a varying degree in the rate of growth. To compare the growth-promoting effect of the various fats with each other and with summer butterfat, the growth rate

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 ABSTRACTER: Martin Heerdt

DOCOSENOL FROM FISH OIL

FATTY ACID FRACTIONATION

FUTURE MARKETS FOR DRYING OILS

NUTRITIVE VALUE OF OILS AND FATS

4.7

4.11

0° C., -5° C, and -15° C. These crystals were mixed and recrystallized from methanol, acetone, and n-hexane successively at which stage they totaled 41.5 grams and had a melting point of 31.5-32.2° C, iodine value of 78.7 (theoretical 78.3), and acetyl value of 153.0 (theoretical 152.4). One gram of these crystals when hydrogenated over platinum black and recrystallized from ether had a melting point of 70.3-70.8° C. and proved to be docosenol in a melting point test when mixed with pure docosenol.

The crystalline docosenol obtained above was used in the preparation of an undecanoic acid which when fractionated and recrystallized from water containing acetone, had a melting point of 26.5 - 27.1°. A fraction of the crude undecanoic acid that distilled over at 175-215° C. was used in the preparation of nonamethylene-1,9 dicarboxylic acid, melting point 109.0-110° C. This acid identified the original docosenol as 11-docosen-1-ol. Trans-11-docosen-1-ol having a melting point of 52.4-52.8° C. was also prepared. The infrared spectra of these two alcohols were determined.

Table 2

Sample No.	Refractive Index n_D^{20}	Acid value	Sap. value	Iodine value	Unsaponifiable matter		
					Yield (%)	Sap. value of acetate	Iodine value
1 (Market oil)	1.4712	4.2	130.6	108.4	34.9	163.4	73.9
2 (Visceral oil	1.4709	1.8	135.6	112.6	31.0	165.7	75.4
3[a]	1.4694	2.1	130.3	120.7	34.0	164.2	78.6
4[b]	1.4729	2.8	157.3	115.7	22.5	169.3	80.5
5[c]	1.4783	2.3	137.3	113.5	28.9	172.5	81.3

[a]Liver oil. [b]Oil of internal organs except liver. [c]Body oil.

4.92

in grams of a group of rats on 20 Calories percent summer butterfat and a simultaneously started group on a test fat was compared. The comparison was made by equating the growth-promoting value of the butterfat to zero. Table 3 shows the differences in value after statistical treatment of the data. The numerical values in the table represent approximate percentages because the growth of the rats after 3 weeks on butterfat is about 100 grams.

Table 3
Difference in growth-promoting value (gm) as compared with summer butterfat (3rd week)

GROUP	TYPE OF FAT	CALORIC PERCENTAGE TEST FAT IN THE DIET						
		10	20	30	40	50	60	73
1	Lard	+5	+3	+12	+10	+7	+7	+14
2	Summer butterfat (Av.)	0	0	0	0	0	0	0
3	Olive oil	-	+1	-	−6	-	−4	−6
	Cottonseed oil	+4	−3	+3	+7	−5	−1	−8
	Winter butterfat	0	−1	0	−2	−5	−4	−6
	Beef fat	+3	−3	+1	−3	−3	−2	−10
	Shea butter	+3	−1	−6	−5	−9	−6	−2
4	Maize oil	+2	+4	0	+5	+8	−2	−15
	Soybean oil	+5	0	+3	−9	−6	−3	−12
	Groundnut oil	+3	−3	+2	−6	−4	−8	−18
	Palm fat	−1	−6	0	0	−4	−9	−13
5	Sunflowerseed oil	0	−2	−4	−2	−5	−17	−24
	Poppyseed oil	−2	−5	−2	−4	−4	−14	−29
	Coconut fat	0	−5	−2	−9	−9	−17	−30
6	Sesame oil	−2	+2	−4	−8	−15	−18	−50
	Owalanut oil	+5	−5	−2	−9	−14	−19	−58
7	Whale oil (Av.)	+3	−14	−13	−17	−24	−35	−45
	Herring oil	+1	−12	−19	−27	−40	−48	−59
	Rapeseed oil	−3	−18	−24	−44	−49	−64	†
8	Kapokseed oil	−13	−31	−46	†	†	†	†

4.83

finishes and floor coverings appear to be the two products in which drying oils, if improved, might hope to regain lost markets.

Major recommendations for future drying-oil research are as follows:

First, there should be an increased recognition, in both policy-making and research-planning of the potential value of drying oils as basic chemical raw materials. Three desirable developments that would serve to enhance the position of the drying oils are, (1) competitive prices for the drying oils which would make them attractive as raw materials for developing new or better products; (2) stable prices for oils; (3) adequate production without encouraging over-production.

Second, a research program should be established promptly in which all available sources of information on the results of previous drying-oil research would be thoroughly reviewed, screened, organized, evaluated, and widely disseminated among persons and organizations concerned with the production or consumption of drying oils.

Third, a comprehensive program of fundamental research on drying oils should be initiated, including the following phases: (1) a thorough investigation of the basic chemistry of drying oils; (2) use of this knowledge of the basic chemical composition of drying oils as a starting point for research in the chemical modification of oils; (3) utilization of the materials developed through chemical modification of oils to formulate new products that will serve more effectively as raw materials in established uses or that will find a market in entirely new uses; (4) determination of the mechanism by which oil films dry and the factors that affect color retention in protective coatings.

6.131 NORWAY DEVELOPS NEW SPIRAL PRESS FOR FISH MEAL

Anonymous
Commercial Fisheries Review 17, No. 10, 94(October 1955)

Among the advantages of a new spiral-type fish meal press developed by Norwegian engineers are savings in space and in cost. The spiral press takes only one-third of the space required for a screw press. Prices f. o b Oslo, Norway, are reported to be 85,000 kroner (U.S. $11,900) for the spiral press with a rated capacity of 300 tons per 24 hours and 55,000 kroner (U.S. $7,700) for a smaller spiral press with a rated capacity of 100 tons per 24 hours. Screw presses of similar capacities are about 125,000 kroner (U.S. $17,500) and 100,000 kroner (U.S. $14,000) respectively.

Practical tests indicate that the spiral presses will easily exceed their rated capacities by 50 tons per 24 hours. Another advantage of the spiral press is higher quality fish meal due to lower oil content.

The total weight of the spiral press, exclusive of driving motors is 6,160 pounds and the space occupied is 2 x 1.8 m (6.56 x 5.9 feet)--the greatest height is 1.8 m (5.9 feet). The press is driven by two motors with a total name plate effect of 25 h.p. which proved to be ample.

At the inlet end the press is fitted with a relatively short feeding screw with a low compression ratio. The feeding screw is surrounded by a basket with perforated stainless steel plates. In addition to the feeding action of the screw, this section of the press also serves as a strainer, where some of the free water is removed from the material.

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 ABSTRACTER: Kathryn L. Osterhaug

6.19 SEEK FISH MEAL QUALITY INDEX

Butler, Charles (U. S. Fish and Wildlife Service, Washington, D. C.)
Flour and Feed 56, 17 (June 1955)

Over the years the fish meal quality evaluation problem has been repeatedly attacked, but with baffllingly conflicting results not immediately correlated with any one or more factors such as condition of raw material, processing methods, and packaging or storage procedures.

We have evaluated the results of these previous studies to develop our program. One approach will be to begin with a raw material of known quality as, for example, very fresh whole fish. This material will be subjected, on a laboratory scale, to the treatments characteristic of the fish reduction process.

At the same time we will be operating, in a major fish reduction area, pilot scale equipment closely resembling commercial equipment. The pilot runs will be used to vary, in a predetermined and accurately controlled pattern, the essential variables that may be influencing meal and oil product characteristics.

These meal lots of known history, then will be screened by chick assays to yield clues to their nutritive quality. Unknown growth factor assays are planned for some of these screened lots of meal. Some meals will be tested in broiler ration experiments.

By these diverse and simultaneous attacks we hope to turn up a sufficient backlog of data on the raw materials and on the fish meals in all the stages of processing and storage to provide clues on the problems of ration formulation.

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6.3 ALGIN - VERSATILE FOOD IMPROVER

Gibsen, K. F.; and Rothe, L. B. (Kelco Company, San Diego, California)
Food Engineering 27, 87 (October 1955)

Algin products are used in a number of food items ranging from ice creams and sherberts to salad dressings, bakery goods, syrups, quick-mix foods, and sausage casings. In these foods they act as thickening, suspending, stabilizing, emulsifying, gel-producing, or film-forming agents without inhibiting or masking flavors. Many of the alginates combine two or more of the above mentioned properties, and all are readily compatible with food ingredients under all kinds of conditions.

The first algin product to gain commercial prominence, and still the most widely used, is sodium alginate. It is available in high, medium, and low viscosity grades that are suitable for use in a pH range of 4 to 11. Propylene glycol alginate, another algin derivative that has attained commercial prominence within the past few years, has unusual water thickening properties as well as pronounced emulsifying characteristics for oil-in-water emulsions having a pH of 2 to 7. Other commercially valuable products are calcium, potassium, and ammonium alginates. Table 2 lists a number of typical food applications of the alginates.

Algin is available as a uniform free-flowing granular or fibrous powder. When used in a liquid formula, it should be dry blended with a portion of other dry ingredients, such as sugars or spices, then dissolved in water with good agitation. As algin is readily soluble in cold, aqueous mediums it is used advantageously in dry blended prepared mixes. For the housewife, these products require only the addition of cold milk or water followed by simple mixing to form puddings, meringues, icings, or dessert gels

Calcium salts added to an algin solution cause a thickening or gelling action to take place. This reaction can be controlled to give the desired flow or gel properties.

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 ABSTRACTER: Martin Heerdt

6.3 (continued) ALGIN - VERSATILE FOOD IMPROVER

Table 2--Typical Food Applications of Algin Products

Use	Product	Amount Used Percent	How Used	Purpose
Bakery jelly	Sodium alginate	0.1 of jelly	Cook with pectin.	Retards syneresis. Soft, easily spread gel.
Pie filling	Sodium alginate	0.3-0.5 of total filling	Dissolve in part of water, mix with cooked starch, add sugar, fruit	Soft, smooth gel body. Improved clarity, gloss. Full flavor, prevents separation, cracking.
Ice cream	Milk soluble sodium alginate	0.15-0.4	Water dispersion, dry mix with sugar	Maintains smooth texture, during storage, smooth meltdown without serum drainage, improve whipping.
Confectionery gels and fillings	Sodium alginate	0.1-0.7	Dissolve in water, add sugar, cook add acid, etc.	Makes clear candy gel for tender-to-chewy eating qualities. Retains moisture, retards syrup separation.
French dressing	Propylene glycol alginate	0.5	Dissolve in water, add vinegar, oil, etc.	Uniform emulsion with long shelf life.
Meat sauce	Propylene glycol alginate	0.5-1.0	Dissolve in water, add salt, conti ment, etc.	Smooth, heavy, uniform body, prevents separation.

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 ABSTRACTER: Martin Heerdt

6.19

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Table 2--Typical Food Applications of Algin Products (continued)

Use	Product	Amount Used Percent	How Used	Purpose
Icing	Gel forming algin	3-8 oz. per 100 lb. sugar	Dissolve in water.	Quick set and drying. Non-sticking retards melting. Tender, soft body.
Flavor emulsion	Propylene glycol alginate	1.0-3.0	Dissolve in water.	Stable emulsion.
Dessert gels	Sodium alginate	0.8	Dry mix with sugar, citric acid, etc. Dissolve in hot water.	Clear, firm gel, quick set.
Milk puddings	Milk soluble sodium alginate	0.8	Dry mix with sugar, cocoa, etc. Dissolve in cold milk.	Quick, easy mix with cold milk to form smooth, firm gel in 1 hr.
Syrups, toppings, purees	Sodium alginate, propylene glycol alginate	0.1-0.5	Dissolve in water, add to syrup.	Heavy, smooth body without excessive sweetness. No masking of flavor, prevents separation.
Frozen fruit	Propylene glycol	2.0	Dry mix with sugar, sift into fruit, mix.	Uniform, heavy body, prevents syrup separation. Smooth texture when frozen. Bright color, glossy appearance, full flavor.
Dietetic foods	Sodium alginate, propylene glycol alginate	0.2-2.0	Dry mix or in water, add protein, etc.	Thickener, smooth, heavy body.
Dry mixes	Sodium alginates, propylene glycol alginates	0.05-1.0	Dry blend.8	Easy mixing. Improved texture and and shelf life of finished convenience foods.

6.131

The pressing section consists of two rotary strainer wheels with gear teeth on the periphery. The wheels rotate on a horizontal shaft. The relatively small distance between the two wheels (1 1/4 inches to 1 1/2 inches) determines the thickness of the press cake. Between the wheels a stationary spiral with several coils is provided. The distance between the coils of the spiral diminishes towards the periphery of the strainer wheels producing a continuous channel with diminishing area from the center outwards.

The material is fed by the feeding screw into the center of this channel, and by means of the rotative movement of the strainer wheels, the material is carried forward through the converging channel. Pressure is obtained by the converging channel and oil and water are removed on both sides. By the rotation of the wheels, any sludge that may be pressed out is continuously washed off the strainer plates so that they are kept clean and open.

The compression ratio may be regulated during the operation as the last section of the spiral is hinged so that it can be screwed in against or out away from the adjacent wall of the spiral. With this arrangement, it is possible to regulate the degree of pressure and to adjust the press to suit the material being handled.

6.3

7.66 NEW COLOR REACTION FOR VITAMINS D

Lyness, W. I. and Quackenbush, F. W. (Department of Biochemistry, Purdue University, Lafayette, Indiana)
Analytical Chemistry 27, 1978-1980 (December 1955)

Two problems have impeded the development of a satisfactory chemical or physicochemical method of assay for the vitamins D:

1. The vitamins have been extremely difficult to separate quantitatively from other closely related compounds.
2. Known reactions have lacked specificity or sensitivity, or both.

Of the methods of assay that have been proposed, none has come into common use. Direct spectrophotometry in the ultraviolet and infrared regions lacks specificity. Measurement of colors derived from the vitamins, however, has found wider acceptance. Two of the color reactions--one with antimony trichloride and the other with glycerol dichlorohydrin--have continuously stimulated interest. Improvements on the original antimony trichloride procedure have produced a method that has good sensitivity but that lacks specificity. Improvements in the glycerol dichlorohydrin method have increased the sensitivity of the reagent by a factor of 20, but sensitivity is still one of the limitations of this method.

The authors of the present paper have discovered a new color reagent that is highly specific for vitamins D and that may give rise to a method with fewer shortcomings than the others that are currently available. (This reagent is made as follows: to a flask of ethylene dichloride are added 80 parts per million of mercuric p-chlorobenzoate and sufficient iodine to produce an absorbance, at 500 millimicrons, of 0.182 ± 0.002. This solution is about 0.20 millimole with iodine). The paper describes the responses of pure vitamins D and related sterols to this reagent. A part of the data is given in the accompanying tables, over.

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 ABSTRACTER: F. Bruce Sanford

7.80 QUANTITATIVE ODOR MEASUREMENT

Clausen, D. F.; Felt, C. E.; Borchardt, L. F.; and Reinsch, A. A. (General Mills Research Laboratories, Minneapolis, Minnesota)
Modern Packaging 29, 149-156 (November 1955)

It has been shown that odor sensitivity is a function of concentration of the odorous substance in the air and the force with which the air stream strikes the odor-sensitive area. The odor threshold is a function of the mass of odorous substance in contact with the odor sensitive area per unit time. For these reasons, the velocity of the air stream is critical and, for quantitative purposes, the sniff must be standardized or some means found to control the rate of air flow into the nasal cavity. The volume of air containing the odorous substance involved in the sniff is not critical within wide limits.

A person's sensitivity to odor and taste is a function of many psychological and physiological states.

According to the general Weber-Fechner law for sensations, for any given individual, there is a constant fraction of the stimulus intensity that must be added to or subtracted from that stimulus before the observer can detect any change at all in the stimulus intensity. This fraction is called the Weber coefficient. The Weber coefficient for smell lies between 1/6 and 1/2, with the mean at about 1/3 for most people. The practical result of this is that, on the average, no odor test involving the nose as a detector can have an error less than 33 percent.

Elsberg states seven rules for an olfaction test: (a) the threshold should be measured; (b) the sensitivity should be high; (c) the test should be quantitative; (d) olfactory and trigeminal factors (burning, hot, stinging, and cold) should be separated by the test; (e) the odor-laden air should be carried to the odor sensitive area without sniffing on the part of the subject used as detector; (f) the volume of air and the velocity of the air stream or force of the sniff should be controlled.

An instrument built at the authors' laboratory is a modification of the Elsberg olfactometer. Figure 3, over, shows the instrument in use with the subject's head in position.

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 ABSTRACTER: Kathryn L. Osterhaug

7.80 A HOUSEHOLD AND A LABORATORY TYPE OF PANEL FOR TESTING CONSUMER PREFERENCE

Miller, P. G.; Nair, J. H.; and Harriman, A. J.
Food Technology 9, 445-449 (September 1955)

For a bland type of food product the consumer panels tended to show a bias for the sample tasted first. The bias due to order of tasting tended to be more erratic when comparing samples differing only slightly in flavor and appearance.

The no preference votes were high in comparison of products similar in flavor and appearance, and tended to decrease as the difference in flavor and/or appearance became greater. The no preference votes tended to decrease as the preference for one sample over the other increased.

Two panels testing identical (i.e. duplicate) samples gave no preference for either sample but the bias due to the order of tasting was large. Two panels, comparing the same samples differing essentially only in flavor gave large preferences for one over the other, but opposite samples were chosen by the two panels.

Comparisons of samples with marked differences in appearance gave good checks with duplicate panels. A panel judging a pair of samples differing essentially only in flavor gave a large preference for one over the other on the first test, but upon succeeding tests a definite preference was not indicated.

There was a general agreement in preference between the consumer panel and the laboratory type of panel.

 Author's summary

7.85 A DIRECT MICROSCOPIC DETERMINATION OF BACTERIA AS A MEANS OF DETERMINING FRESHNESS OF MARINE FISH

Wittfogel, H. (The State Veterinarian Research Institute, Nebenstelle, Cuxhaven)
Die Fischindustrie 10, 279-281 (October 1955)

Considerable background information is given on theoretical aspects of determining the numbers of bacteria as an index of quality.

The method recommended is to scrape off the skin and with a sterile knife cut out a section of flesh about one centimeter square and one-half centimeter deep. It is not necessary to flame the flesh surface or use a hot knife to cut the section tissue. About five grams of fish muscle should be taken and weighed. Care should be taken that sections are not selected near any body openings or the aorta, or near any puncture marks. The material is then diluted, one to ten by weight, with physiological salt solution and ground for one minute in a mortar with sea sand. The material is then transferred to a flask and shaken back and forth 25 times with glass beads in the flask. With a suitable pipette, 0.01 milliliters of supernatent liquid is measure to a one square centimeter plate. The plate should be marked with suitable divisions for counting fields. The preparation is allowed to dry in the air, fixed by passing through a flame and is stained with Loeffler's methylene blue. The bacteria are thereby stained dark blue and the background is a light blue color. It is not necessary to defat the tissue as is done in determining the bacteria content of milk.

The bacteria are then counted under an oil immersion lens. The number of fields that are counted depends on the number of bacteria in the tissue. If only 10^5 bacteria per gram are present it is usually necessary to count 100 fields. If more bacteria are present the number of fields can be reduced to 33, 25, or 10. The number of bacteria present are used as the index of spoilage. When using this direct method it requires about 100,000 bacteria per gram of tissue to indicate a significant decrease in freshness.

 ABSTRACTER: Hugo W. Nilson

VITAMINS D COLOR REACTION

CONSUMER PREFERENCE TESTING

USE OF OLFACTOMETER

FRESHNESS TEST FOR FISH

7.85

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A syringe filled with pure air is placed on the olfactometer and the subject used as odor detector sits before the instrument with the nosepiece inserted into one nostril. With the apparatus set to dispense 100 cc. of gas in four to five seconds, the machine is started and the gas inside the syringe is discharged into the nasal cavity. During this interval the detector tries not to breathe.

Next, the syringe containing the diluted standard is tested in the same manner and the detector tells the operator whether or not the sensation differs from that of pure air. The threshold is defined as that concentration at which the detector can just barely tell the difference between the standard and pure air. After the sensitivity of the detector is established by the use of the standard, the unknown's are presented for evaluation.

It has been found that only certain persons lend themselves to use as detectors. The person must be completely disinterested in the proceedings. Any attempt on the part of the detector to search out the odor will result in the detection of non-existent odors.

7.80

Table 1. Reactivity of Reagent with Vitamins and Sterols
(Readings taken at 7 minutes)

Compound	Concentration Millimole/ Liter	Absorbance, 450 mμ
None (blank)	...	0.038
Vitamin D_2	0.05	1.060
Vitamin D_3	0.05	1.060
Vitamin A	0.10	0.130
Lumisterol	0.50	0.039
Ergosterol	0.50	0.039
7-Dehydrocholesterol	0.50	0.033
Cholesterol	0.50	0.037
Stigmasterol	0.50	0.037
Sitosterol	0.50	0.037

Table 3. Comparison of Absorptivities of Vitamins D and Certain Sterols in Three Color Reactions

Compound	Absorptivity at Wave Length of Maximum Absorption: Iodine reagent	Antimony trichloride[a]	Glycerol dichlorohydrin[b]
Vitamin D_2	530	1800	360
Vitamin D_3	545	1850	370
Ergosterol	0.0	5	14
7-Dehydrocholesterol	0.0	8	0.3
Cholesterol	0.0	25	0

[a] Improved reagent containing acetyl chloride; from data of Mueller (6).

[b] From data of Campbell (2).

7.66

Table 4. Effect of Mercuric Benzoate Additions on Intensity of Color Developed with 0.05 mM Vitamin D_2

Mercuric Benzoate Added, P.P.M.	Maximum Absorbance, 450 mμ
None	0.132
6.3	0.640
11.5	0.915
12.7	0.970
13.5	0.990
14.3	0.970
19.0	0.900
38.0	No Color Formation

2.6 CONVENIENCE -- PLUS QUALITY

McLean, Beth Bailey
The Canner and Freezer 121, 12-13 (December 26, 1955)

In canned foods offered homemakers, convenience plus quality is an essential yardstick. The home economics department can be a vital factor to any processor and a factor which can make a real contribution to sales.

The home economist is trained to know food preparation and to have high standards for foods. These standards can be of special guidance in the development of new products. Also, through working with plant, production, research, and product people she knows the problems of production, the possibilities for products, and the limitations placed upon an item because of plant processing, labor costs and competitive pricing.

The home economist knows women consumers. It is her business to keep in close contact with them through correspondence and personal meetings. As home economists keep house and cook for their families or maintain bachelor girl apartments, they are absorbing vital information as they shop with homemakers. Thus, a home economist can suggest ideas for new products, new can sizes and styles for current products to keep her company abreast of changing trends in family food service and marketing habits.

The home economist may serve as a "conscience" for the production men, reminding them that standards must be pushed even higher to increase sales. As the homemakers representative, she should serve as a guardian of quality food standards.

(over)

 ABSTRACTER: Thelma S. Rose

3.33 QUEST FOR QUALITY BEGINS ABOARD TUNA FISHING VESSELS

Anonymous
Pacific Fisherman 54, 11 (January 1956)

The first annual Raw Fish Quality Symposium was held December 7, 1955 in Long Beach, California under the auspices of the California Fish Canners Association. The symposium took place in connection with a conference on sanitation December 6 conducted by the National Canners Association and the fifth annual Tuna Cutting, December 8.

The raw fish symposium coincided with the awarding of a contract for technological study of problems of tuna refrigeration at sea and in processing ashore (financed by Saltonstall-Kennedy funds) to the University of California. The technological work will be under the direction of Dr. Lionel Farber of the University of California Hooper Foundation and Maurice Stansby and John Dassow of the Fish and Wildlife Service.

The California Fish Canners Association will pay the costs of maintaining a technician aboard the tuna fishing vessels. Interviewers will conduct a tuna boat questionnaire program to collect specific boat information including details on refrigeration equipment, such as number of wells, brine system, compressors, and refrigeration lines.

In addition, details on handling of tuna before chilling and chilling procedures will be included as well as brine makeup, freezing of fish, storage temperature, and fluctuation, and thawing procedures.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

3.26 "TAILOR" YOUR PRODUCT TO ITS MARKET

Roberts, Irving
The Canner and Freezer 121, 15-17 (December 12, 1955)

Through continuous market research at the retail level, a prominent Boston firm has shown that the frozen food processor's best sales approach is by "tailoring" his product to market needs:

(1) The retailer wants a quality product geared to consumer tastes. Word-of-mouth advertising coupled with extensive newspaper and radio promotion helps to establish a growing demand.

(2) Distinctive, compact packages stimulate store sales. Attractive, individual color backgrounds for packages along with colored display strips, developed for insertion in price slots of frozen food counters, help to call consumer's attention to the product.

(3) Developing more efficient production from hand operation to one completely automatic enables company to lower costs and reduce waste thus meeting competitive prices in their field.

Continuous market research along with personal contact with grocer and consumer help to develop products "tailored" to meet the market needs.

 ABSTRACTER: Thelma S. Rose

9.7 HOME SERVICE HAS MANY FACETS

McCallum, Verna (Stokely-Van Camp, Inc.)
The Canner and Freezer 121, 22-23 (October 17, 1955)

Repeat purchases of a brand or kind of processed food is usually due to three factors: price, quality, and service.

In many food processing companies, the home economics department is not only a department of consumer services, but also a general service department and a relations department. The home economics unit can aid the evaluation division, the label department, and sales and advertising. Often this department aids areas of consumer service and relations not handled by any other group within the organization.

Part of the work of the home economics division is the tasting of products and recipes. The taste testers are usually the firm's employees with consistent judgment. Such people's tests represent a small cross section of consumers.

The home economics units can perform direct service as a means of selling. The homemaker can be reached directly through cooking schools, broadcasts, TV programs, and the like. Suggestions for serving and meal planning are the most popular types of information. The young shoppers of the household are also a group worthy of contacting.

Indirectly, the homemakers can be reached by educators such as county extension agents and teachers, and communicators, such as writers and broadcasters. Methods of passing on a food processor's information are several: examples are addressing and demonstrating before various organizations and newsletters directed to home economists.

 ABSTRACTER: Lois Elgin

ROLE OF HOME ECONOMIST

PRODUCTS TAILORED TO MARKET

CANNED TUNA INVESTIGATION

HOME ECONOMISTS IN FOOD INDUSTRY

3.26

9.7

2.6 (Cross Reference: 3.30)

Promotion is also the home economist's job. Effective use of the label with color food photographs and recipe suggestions are read and appreciated by homemakers. She writes material for magazines, newspapers, radio and television scripts. The home economist is an important "ghost", influencing the homemaker to purchase canned foods frequently through the exciting recipes and menu ideas.

3.33 (Cross Reference: 1.10)

At the conclusion of work at sea, the fish in each lot will be examined, weighed and graded at the cannery in the raw and precooked forms. Shrinkage during freezing and product yield will be determined for each lot. Samples of the raw and precooked fish in each lot will be sealed in cans and frozen for later salt analysis and chemical tests. Half of the remaining fish in each lot will be canned and heat processed as usual in oil but with no added salt. The remaining half will be canned and heat processed with distilled water only added to the cans.

The canned samples will be examined and analyzed for quality comparison and salt content. Laboratory tests will include (1) grading of color; and (2) press weight under proposed tuna standards; (3) chemical tests; (4) degree of rancidity of the flesh oil in frozen samples.

In outline form, the entire project consists of (1) initial handling of fish at sea; (2) chilling; (3) freezing; (4) storing; (5) thawing.

0.33 ARSENOLYSIS AND PHOSPHOROLYSIS OF CITRULLINE

Krebs, H. A. and Eggleston, L. V. (University, Oxford, England)
Ann. Acad. Sci. Fennicae, Ser. A, II. No. 60, 496-502 (1955) (In English)
Chemical Abstracts 49, 9060 (July 25, 1955)

The arsenolysis or phosphorolysis of citrulline, yielding ornithine, NH_3, and CO_2, was shown to be catalyzed by a "citrulline-phosphorylase" in dogfish liver (Scylliorhinus canicula) and seedlings of peas (Pisum sativum) and beans (Phaseolus vulgaris and P. lunatus). Enzyme activity was higher in the seedling embryo (about 1/5 that of guinea-pig liver) than in the cotyledons. Arsenolysis was always faster than phosphorolysis, however, phosphorolysis was accelerated in all cases by the addition of E. coli which contains ornithine decarboxylase.

0.6 SALT FROM THE SEA

Anonymous
Chemical and Engineering News 33, 2329 (May 30, 1955)

(Abstract of this article appears under 6.1 page 17 - September 1955)

0.8 NEW REFRIGERATING PRINCIPLE?

Anonymous
World Refrigeration and Air Conditioning 5, 382 (July 1954)

(Abstract of this article appears under 3.231 page 3 -- November 1954)

1.10 COOKED TUNA VENTURE

Anonymous
Fisheries Newsletter 14, 5 (November 1955)

An Australian has established a processing factory to produce two products - tuna chicken and smoked tuna ham. Both are cooked and ready to eat cold. Samples inspected in the Commonwealth Fisheries Office were judged to be attractive in appearance and taste.

1.10 GATT: GENERAL AGREEMENT ON TARIFFS AND TRADE

Anonymous
Pan American Fisherman 9, 10-11 (July 1955)

(Abstract of this article appears under 1.0112 page 19 - September 1955)

1.89 STUDIES ON THE CHARACTERISTIC ODOR OF CUTTLEFISH. I. ON THE BASIC SUBSTANCES

Yamanishi, Tei and Matsuzaka, Takako
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 9, 850 (1955) (English abstract)

The odorous substance can be assumed to be a sulfur containing amine with piperidine nucleus which is easily decomposed when heated with acid or weak alkali.

1.9 WOODS HOLE BIOLOGISTS EXPERIMENTING TO FIND BEST MESH SIZE FOR WHITING

Anonymous
Maine Coast Fisherman 9, 23-25 (April 1955)

(Abstract of this article appears under 2.1121 page 19 - June 1955)

2.01 STUDIES ON PUTREFACTION OF AQUATIC PRODUCTS. XVIII. ON PUTREFACTION OF SOME WHITE-MUSCLE FISHES, MOLLUSCA AND SHRIMP. XIX. INFLUENCE OF CERTAIN SUBSTANCES UPON HISTAMINE FORMATION

Simidu, Wataru; Hibiki, Sigeyuki; and Nagasaki, Susumu
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 9, 804, 808 (1955) (English abstract and figures)

2.111 A VISCOMETRIC STUDY ON THE WEAKENING OF COTTON NETTING CORDS IN THE SEA

Kishimoto, Akira
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 9, 755 (1955) (English summary and figures)

The tensile strengths of single yarns began to decrease after 30 days' immersion, reach one-half of the initial value after 60 days and dropped to zero after 90 days.

2.111 THE TENSILE STRENGTH OF KUREHALON NETTING CORD OF VARIOUS TWIST

Koizumi, Takashi
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 9, 759 (1955)

The tensile strength, the diameter, and the shrinkage of 2/4 and 3/6 netting cords made with 100D x 15 Kurehalon (KP) yarns of 50 centimeter length.

2.111 NETTING AND ITS SECRETS (7)

Jeffs, F. E.
World Fishing 4, 39 (November 1955)

2.111 NETTING AND ITS SECRETS (8) ACCURATE NET PLANNING

Jeffs, F. E.
World Fishing 4, 38 (December 1955)

2.111 MECHANICAL STUDIES OF FISHING NET MATERIALS, III. SOME INFORMATION ON THE TENSILE STRENGTH OF NETTING CORD (2)

Miura, Tetsuo
Bulletin of the Faculty of Fisheries, Hokkaido University 5, No. 4, 377 (February 1955) (English abstract, tables, and figures)

2.114 TRAWL CABLE METER

Anonymous
World Fishing 4, 58 (November 1955)

A meter that indicates the number of fathoms of trawl cable run off the winch has been developed by an instrument laboratory at Cove, Washington.

2.115 ON THE INSTABILITY OF SHIP'S ROLLING DUE TO THE HEAVING CAUSED BY WAVES

Kawashima, Rihei
Bulletin of the Faculty of Fisheries, Hokkaido University 5, No. 4, 368 (February 1955) (English abstract, figures, and tables)

3.231 THE NEW THERMODYNAMIC PROPERTIES OF FREON 12

McHarness, R. C.; Eiseman, B. J., Jr.; and Martin, J. J. (E. I. duPont de Nemours & Co., Inc. and University of Michigan)
Refrigerating Engineering 63, 31-44 (September 1955)

The primary objective of the present work has been to provide a new set of tables and charts which will meet all possible needs of the refrigeration and other industries, particularly as regards range, accuracy, and consistency. We believe this has been accomplished. The steps taken to fulfill our objective were as follows: (1) to review the extent and accuracy of the existing data available for "Freon 12" dichlorodifluoromethane and to make the additional measurements required; (2) to develop a new set of equations which would fit the expanded data with the desired accuracy over the entire range; (3) to carry out the calculations and to prepare the finished tables and charts.

3.231 A FIELD EVALUATION OF THE PERFORMANCE OF VAPOR VENTED INSULATION IN A LARGE FREEZER WAREHOUSE

Queer, Elmer R. and McLaughlin, E. R.
Refrigerating Engineering 64, 29-34 (January 1956)

The "Dry-Wall" construction using preformed fibrous glass insulation erected without bitumens or intermediate vapor-resistant surfaces shows an overall thermal performance consistent with, or better than results anticipated by calculation. The indicated thermal conductivity (k) of the insulation in place is 0.22 Btu in/sq ft, hr, deg F.

3.234 DETERMINATIONS OF ENTHALPIES INVOLVED IN FOOD FREEZING

Mannheim, H. C.; Steinberg, M. P.; and Nelson, A. I. (University of Illinois, Urbana, Illinois)
Food Technology 9, 556-559 (November 1955)

A Dewar flask colorimeter was calibrated for use in the determination of enthalpy or heat content changes involved in freezing and thawing of ground beef, bananas, and carrots. The experimentally determined enthalpy values were not significantly different from those calculated using data found in the literature. The same amount of energy was involved whether freezing or thawing a food. Food factors to observe when calculating the enthalpy of a food from published data are (1) the exact moisture content, (2) the unfrozen water content, (3) the average temperature before and after cooling or freezing, and (4) congruence of the freezing method with the experimental method.

3.236 (Cross References: 1.81, 3.237)

OYSTER STICKS ARE NEW PRODUCT OF OLYMPIA OYSTER COMPANY

Anonymous
Frosted Food Field 21, 14 (July 1955)

3.239 TECHNIQUES OF FREEZING AND STORING FISH AND SEAFOOD

Butler, Charles (U. S. Fish and Wildlife Service, Washington, D. C.)
Frosted Food Field 20, 80-82 (March 1955)

(Abstract of this article appears under 3.230 page 5 - July 1955)

3.26 THE DEVELOPMENT OF A SOLID-ABSORPTION REFRIGERATING MACHINE FOR USE ON TRAINS. II.

Andrews, H. I.
Modern Refrigeration 58, 381 (October 1955)

3.29 LABELING FOODS OF LOW SODIUM AND LOW CARBOHYDRATE CONTENT

Nelson, E. M.
Journal of the American Dietetic Association 31, 33-36 (January 1955)

(Abstract of this article appears under 9.3 page 9 - July 1955)

3.5 STUDIES ON THE VARIATION OF LIPID IN DISCOLORATION OF SALTED AND DRIED FISH

Higashi, Hideo; Murayama, Shigeo; Yanase, Masaaki; and Tabei, Kikuko
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 8, 741 (1954) (English summary, figures, and tables)

During the discoloration of dried fish various conjugated double bonds are formed in fatty acids of the surface lipids.

4.13 EICOSENOIC ACID IN SOME NATURAL GLYCERIDE OILS

Hopkins, C. Y. and Chisholm, Mary J. (National Research Council, Ottawa, Canada)
Canadian Journal of Chemistry 32, 1033-1038 (1954)

Eicosenoic acid (I), m. 21-23.6° was isolated as its Me ester, $b_{0.1}$ 147-52°, from the seed oils of rutabaga (Brassica napobrassica) and pennycress (Thlaspi arvense), dogfish liver oil (Squalus acanthias), and beluga blubber oil (Delphinapterus leucas) in 6, 7, 11, and 4 percent yields respectively.

4.19 THE MOLTING CYCLE OF THE SPINY LOBSTER, (PANULIRUS ARGUS.) II. PRE-ECDYSIAL HISTOLOGICAL AND HISTOCHEMICAL CHANGES IN THE HEPATOPANCREAS AND INTEGUMENTAL TISSUES

Travis, Dorothy F. (Harvard University)
Biol. Bull. 108, 88-112 (1955); cf. ibid. 107, 433 (1954)
Chemical Abstracts 49, 8512 (June 25, 1955)

Lipides are abundant in the hepat opancreas from the time of intermolt until molt, apparently supplying energy. Three to 5 days before molt, there are accumulations of glycogen, alk. phosphatase, and Ca in the integumental tissues and in the hepatopancreas. The glycogen appears to be involved in resorptive and secretory processes and in the deposition of Ca phosphate.

4.29 FATTY ACID AMIDES. VII. ADDITION OF HYDROGEN CYANIDE TO UNSATURATED ACIDS. PREPARATION OF FORMAMIDO ACIDS, AMINO ACID SULFATES AND AMINO ACIDS

Roe, Edward T. and Swern, Daniel
Journal of the American Chemical Society 77, 5408-5410 (October 20, 1955)

Liquid hydrogen cyanide has been added to the double bonds of oleic, 10-hendecenoic and ricinoleic acid in 85-95 percent sulfuric acid to give good yields of formamidostearic, formamidohendecenoic and hydroxyformamidostearic acids, respectively. The first two are rapidly hydrolyzed by refluxing with aqueous sulfuric acid to give the corresponding amino acid sulfates in high yield. These can be converted to the free amino acids by neutralization.

Reaction of hydrogen cyanide with linoleic acid resulted in some addition, but no identifiable products could be isolated. The high viscosity of the reaction product suggested that polymerization, caused by sulfuric acid, predominated.

5.1 THE VITAMIN A IN THE LIVER OF SQUALUS SUCKLEYI

Yamamura, Y.
Bulletin of the Japanese Society of Scientific Fisheries 15, 611-614, 635-637 (1950)
Chemical Abstracts 49, 4232 (1955)

I. Distribution of vitamin A in each lobe
III. Difference in external and inner layers of the liver

5.111 THE CONFUSING STORY ABOUT VITAMIN A AND ALCOHOL

Anonymous
Journal of the American Oil Chemists' Society 31, 29 (August 1954)

(Abstract of this article appears under 5.112 page 3 - February 1955)

5.112 STABILITY OF VITAMIN A IN AQUEOUS DISPERSIONS AND IN OILS

Patel, S. M.; Kumita, U. S.; and Radhakrishna, Rao, M. V. (Haffkine Inst., Bombay)
J. Sci. Ind. Research (India) 14C, 17-21 (1955)
Chemical Abstracts 49, 8557h (June 25, 1955)

The relative stability of vitamin A in aq. and oily media and the protective action of a few antioxidants on aq. and oil vitamin A alc. solns. was studied at 28° ± 2° and at 85° ± 2°, and at various pH values at 45° ± 2°.

5.119 THE ADSORPTION OF VITAMIN A FROM OILS BY SOAPS FORMED IN SITU

Brocklesby, H. N. and Kuchel, C. C.
Journal of the Fisheries Research Board of Canada 4, 174-183 (December 1938)

(Abstract of this article appears under 6.237 page 15 - September 1954)

6.237 STUDIES ON THE ECONOMICAL MANUFACTURE OF VITAMIN A CONCENTRATE FROM FISH LIVER OIL. V. CONCENTRATION OF VITAMIN A BY SAPONIFICATION 3. LIQUID-LIQUID EXTRACTION (PART A.)

Shimma, Yaichiro and Kikuchi, Ryo
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 7 653 (1954) (English summary and tables)

An attempt was made to obtain vitamin A concentrate by liquid-liquid extraction.

6.3 SEAWEED AS A SOURCE OF YEAST FOOD. I. AND II.

Morris, E. O.
Journal of the Science of Food and Agriculture 6, 611-618 (October 1955)

Aqueous extracts, laminarin, fucoidin, D-mannitol, sodium alginate, and D-fucose from seaweeds were used as media or as media supplements for the cultivation of 46 strains of yeast representing a wide range of yeast genera. Extracts from Laminaria cloustoni (frond) were found to afford the most suitable media. Candida krusei, Candida solani, Nadsonia fulvesceus, Pichia membranaefaciens, and Oaspora lactis were the most prolific yeasts.

Polysaccharide fractions from seaweeds were hydrolyzed with various enzymes. Malt extracts and extract filtrates from Myrothecium verrucaria provided effective hydrolytic enzymes, and seaweeds treated with these enzymes afforded excellent media for growing yeast.

LIST OF PUBLICATIONS REGULARLY ABSTRACTED

Analyst
Analytical Chemistry
Archives of Biochemistry and Biophysics
Biochemical Journal
Bulletin of the Faculty of Fisheries, Hokkaido University
Bulletin of the Japanese Society of Scientific Fisheries
California Fish and Game
Canadian Fisherman
Canadian Journal of Chemistry
Canadian Journal of Technology
Canner
Chemical Abstracts
Chemical and Engineering News
Chemical Engineering
Chemistry and Industry
Commercial Fisheries Review
Drug and Cosmetic Industry
FAO Fisheries Bulletin
Federation Proceedings
Feedstuffs
Fisheries Newsletter (Australia)
Fish. Res. Bd. Can., Prog. Repts. Atlantic Coast Stas.
Fish. Res. Bd. Can., Prog. Repts. Pacific Coast Stas.
Fisherman
Fishing Gazette
Flour and Feed
Food Engineering
Food Manufacture
Food Packer
Food Preservation Quarterly
Food Processing
Food Research
Food Science Abstracts
Food Technology
Frosted Food Field
Industrial and Engineering Chemistry
Industrial Refrigeration
Journal of Agricultural and Food Chemistry
Journal of Applied Chemistry
Journal of Biological Chemistry
Journal of Home Economics
Journal of Nutrition
Journal of the American Chemical Society
Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
Maine Coast Fisherman
Meldinger Fra SSF (Herring Industry, Norway)
Modern Packaging
Modern Refrigeration
National Fisherman
National Provisioner
Nature
Nutrition Reviews
Pacific Fisherman
Pan American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
Refrigerating Engineering
Report of the Food Investigation Board (Great Britain)
Science
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Fisheries
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

Editorial Clerk (Typist)--Betty Anne Brookbank

6.5 STUDIES ON INSULIN OF THE MARINE MAMMALS, IV. ON THE LANGERHANS' ISLETS AND THE EXTRACTION METHOD

Saito, Kaname and Yokoyama, Akira
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 7, 621 (1954) (English summary, figure, and tables)

The yield of insulin from the seal pancreas was examined using various extraction methods, such as Dudley's, Scott's and the acidic acetone methods.

6.54 THE BIOLOGICAL VALUE AND TRUE DIGESTIBILITY OF THE PROTEINS CONTAINED IN WHITEFISH FLOUR, THE STANDARD LOAF AND STANDARD LOAF SUPPLEMENTED BY WHITEFISH

Irving, J. T.; Smuts, D. B.; and Sohn, E. G. (University of Capetown)
S. African Med. J. 26, 206-207 (1952)
Chemical Abstracts 46, 5737 (June 25, 1952)

6.86 PHYSICOCHEMICAL STUDIES ON THE SKIN AND LEATHER OF MARINE ANIMALS. XII. THE CONTENT OF HYDROXYPROLINE IN THE COLLAGEN OF DIFFERENT FISH SKINS

Takahashi, Toyo-o and Yokoyama, Wakichi
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 6, 525 (1954)

7.43 LABORATORY EXAMINATION OF FOODS VIII. INDIRECT ESTIMATION OF SOLIDS CONTENT

Kefford, J. F. (Division of Food Preservation and Transport, Homebush, N.S.W., Australia)
Food Preservation Quarterly 15, 52-56 (September 1955)

Determination of solids content by measurement of specific gravity or refractive index is discussed.

7.61 RECENT ADVANCES IN ESTIMATION OF VITAMIN A

Booth, V. H. (University, Cambridge, England)
Research (London) 3, 497-504 (1950)
Chemical Abstracts 45, 1639 (February 25, 1951)

7.641 REPORT ON VITAMIN B_{12} (MICROBIOLOGICAL METHOD)

Kreiger, Carl H.
Journal of the Association of Official Agricultural Chemists 38, 711 (August 15, 1955)

7.73 PROPOSED STANDARDS FOR FISH STICKS

Anonymous
Fishing Gazette 72, 44-45, 68 (March 1955)

(Abstract of this article appears under 3.236 page 5 - July 1955)

7.81 FRESHNESS-TEST OF CANNED FISH MEATS BY PAPER CHROMATOGRAPHY

Yamanishi, Tei; Hanai, Seiko; Fukuhara, Keiko; and Inagaki, Choten (Ochanomizu University, Tokyo)
Natural Sci. Rept. Ochanomizu Univ (Tokyo) 5, 101-108 (1954)
Chemical Abstracts 49, 8519 (June 25, 1955)

Histamine content of canned fish is correlated with the degree of spoilage and with trimethylamine and volatile N content by means of paper chromatography. Results are comparable to spoilage determinations by the Lubschez method.

7.81 RELATION BETWEEN TIME POST MORTEM AND THE PHTHALEIN VALUES OF AQUATIC ANIMALS

Miyake, Masato and Hayashi, Koichiro
Bulletin of the Japanese Society of Scientific Fisheries 21, No. 2, 123 (1955) (English abstract and tables)

The phtalein value of dead fish decreased gradually with the time.

7.871 COMPARISON OF METHODS FOR DETERMINING FATTY ACID OXIDATION PRODUCED BY ULTRAVIOLET IRRADIATION

Kenaston, Carolyn B.; Wilbur, Karl M.; Ottslenghi, Athos; and Bernheim, Frederick
Journal of the American Oil Chemists' Society 32, 33-35 (January 1955)

(Abstract of this article appears under 4.12 page 11 - May 1955)

8.0 DRY MENHADEN SOLUBLES

Lee, Charles F.
Southern Fisherman 15, 91-92 (February 1955)

(Abstract of this article appears under 6.134 page 13 - May 1955)

8.0 THE COMPOSITION OF LOBSTER MUSCLE

Boyd, Sadie N. (University of Toronto)
Contributions to Canadian Biology No. 3-12, 125-131 (1922)

8.50 THE CHEMICAL COMPOSITION OF THE FLESH OF HERRING FROM THE WEST COAST OF SAKALIN

Levanaidov, J. P.
Rybnoe Khoz. 26, No. 2, 37-40 (1950); Chem Zentr. 1950, II, 1888
Chemical Abstracts 46, 11488 (November 25, 1952)

8.50 SEASONAL VARIATION IN THE CHEMICAL COMPOSITION OF MACKEREL (RASTRELLIGER KANAGURTA)

Venkataraman, R. and Chari, S. L. (Madras Fisheries Technol. Sta., Calicut)
Proc. Indian Acad. Sci. 33B, 126-134 (1951)
Chemical Abstracts 45, 8673 (October 10, 1951)

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Nutrition and medicine, general		
Unknown growth factor	1	0.7
Nutritional value of fishery byproducts other than meal		
Biological value of fish flour	27	6.54
Oils, chemical and physical properties		
Unsaturated fatty acid amides	25	4.29
Oils, nutrition		
Nutritive value of oils and fats	13	4.92
Oils, utilization and marketing		
Fatty acid fractionation	13	4.7
Future markets for drying oils	13	4.83
Preserved fish, miscellaneous		
Radiation sterilization	7	3.19
Irradiation resistant bacteria	7	3.19
Radiation sterilization	11	3.9
Preservatives and sanitation		
Future of cold sterilization methods	9	3.19
Salt fish		
Oil discoloration in salt fish	23	3.5
Extraction of whale insulin	27	6.5
Shellfish and crustaceans, miscellaneous		
Substances in cuttlefish odor	21	1.89
Squid		
Squid mantle enzyme	29	8.59
Spoilage		
Freshness test for fish	17	7.85
Histidine decomposition retardant	21	2.01
Transportation		
Refrigeration on trains	23	3.26
Tuna		
Australian cooked tuna product	21	1.10
Vitamins, vitamin A, chemistry		
Vitamin A distribution in liver	25	5.1
Stability of vitamin A	25	5.112
Vessels, fishing		
Paint for vessel hulls	3	2.113
Vessel construction costs	3	2.115
Removable fish hold	5	2.115
Trawl cable meter	23	2.114
Vessel instability due to rolling	23	2.115

8.53 DISTRIBUTION OF FAT IN THE BODY OF HERRING

Brandes, C. H. and Dietrich, R.
Veroffentl. Inst. Meeresforsch., Bremerhaven 2, 109-121 (1953)
Chemical Abstracts 48, 14000 (1954)

The main deposits of fat in herring are near the dorsal fin. The over-all fat content increases slowly towards spawning time, diminishing rapidly afterwards with simultaneous increase of H_2O, protein, and ash contents.

8.59 STEROLS AND OTHER UNSAPONIFIABLE SUBSTANCES IN THE LIPIDES OF SHELLFISHES, CRUSTACEANS, AND ECHINODERMS. XI. OCCURRENCE OF 7-CHOLESTEROL AS A MAJOR COMPONENT OF THE STEROL MIXTURE OF CHITON. XIII. STEROL COMPONENTS OF STARFISH, LUIDIA QUINARIA.

Yoyama, Yoshiyuki; Tanaka, Tatsuo; and Takagi, Toru (Nagoya University)
Bull. Chem. Soc. Japan 26, 497-499 (1953) cf. C.A. 48, 12770g. Ibid. 27, 39-41 (1954)
Chemical Abstracts 49, 9171 (July 10, 1955)

The unsaponifiable matter of Liolophura japonica caught around Osaki-Shimojima island contains considerable amounts of 7-cholestenol (I) m. 122-2.5°. I was isomerized to β-cholesterol and hydrogenated to cholesterol. The sterol-free fraction of the unsapond. matter contains satd. alcs., probably chimyl and batyl alcohols.

The sterol mixt. of starfish consists mainly of mono-unsatd. compds. which were sepd. by fractionated crystn. of their acetates. Two sterols were obtained, one m. 145° (acetate m. 157°) the other m. 135° (acetate m. 149°). Both consist of Δ^7-sterols of the C_{28} or C_{29} series.

8.59 SOME NON-PROTEIN CONSTITUENTS OF THE TISSUES OF THE LOBSTER

Kermack, W. O.; Lees, H.; and Wood, J. D.
The Biochemical Journal 60, 424-428 (July 1955)

(Abstract of this article appears under 1.87 page 3 - December 1955)

8.59 ADENOSINETRIPHOSPHATASE ACTIVITY OF SQUID MANTLE MUSCLE (LOLIGO PEALII)

De Villafranca, Geo W. (Smith College, Northampton, Massachusetts)
Biol. Bull. 108, 113-119 (1955)
Chemical Abstracts 49, 8512 (June 25, 1955)

The muscle mantle of the squid has an extremely labile myosin-adenosinetriphosphatase (I) which is activated highly by Ca, less Mn, and is not activated by Mg. It lacks a water-sol., or particulate-bound I comparable to that found in vertebrate and certain insect muscles. The pH optimum is approximately pH 5.9. Inosinetriphosphate was hydrolyzed by squid myosin. The specific activity of squid myosin-I is of the same order of magnitude as reported for mammalian myosin.

8.612 VITAMIN A IN FISH MEAL. I. VARIATION IN THE VITAMIN A CONTENT IN FISH MEAT BY THE ANATOMICAL LOCALITY

Hirao, Shuichi; Yamada, Juami; and Kikuchi, Ryô
Bulletin of the Japanese Society of Scientific Fisheries 19, 1047 (1954) (English figures and tables)

8.612 VITAMIN A AND CAROTENOIDS IN CERTAIN INVERTEBRATES. III. EUPHAUSIID CRUSTACEANS

Fisher, L. R.; Kon, S. K.; and Thompson, S. Y.
J. Marine Biol. Assoc. United Kingdom 34, 81-100 (1955)
Chemical Abstracts 49, 7760 (1955)

Concns. of fat, vitamin A, and carotenoids were detd. in 11 euphausiids.

8.615 CHANGES IN THE VITAMIN A CONTENT OF HERRING DURING THE PROCESS OF PRESERVING (OR CANNING)

Junker, Magdalene
Arch. Fischereiwiss. 1, 12-20 (1948)
Chemical Abstracts 46, No. 14 (July 25, 1952)

8.6170 VITAMIN A IN FISH MEAT. III. INDIVIDUAL FLUCTUATION IN THE VITAMIN A CONTENT IN FISH MEAT

Hirao, Shuichi; Yamada, Juami; and Kikuchi, Ryô
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 9, 853 (1955) (English abstract, tables, and figures)

Among the same species of fish, the vitamin A content in the meat has shown fluctuation up to a maximum of about 1.3 to 2.9 times as much as the minimum.

8.6177 INVESTIGATIONS ON THE ADRIATIC ELASMOBRANCHIA LIVER OILS. II.

Cmelik, S.
Acta Adriat. 3, No. 1 (1948)
Chemical Abstracts 43, 5210 (1949)

Phys. and chem. properties of the oils from the liver of Elasmobranchia were detd. Given are color, solidification point, n_D^{20}, d_4^{15}, I no., Reichert-Meisel no., Hehner no., sapon. no., percent unsapond., and percent free fatty acid.

8.6177 VITAMIN A IN 155 GRAYFISH LIVERS

Sanford, F. Bruce; Holland, Gilbert A.; and Bucher, Glenn C.
Com. Fisheries Rev. 12, 17-21 (1950)
Chemical Abstracts 44, 9020 (1950)

8.7 THE COMPOSITION OF THE MILK OF THE BLUE WHALE

Gregory, Margaret E.; Kon, S. K.; Rowland, S. J.; and Thompson, S. Y. (University, Reading, England)
Chemical Abstracts 49, 9177 (July 10, 1955)

The detailed compn. of samples of milk from 3 blue whales (Balaenoptera sibbaldi) is reported in terms of total solids, fat, solids-not-fat, total protein, casein, sol. proteins, nonprotein N, lactose, chloride, ash, Ca, P, Na, K, Mg, vitamin B_6, pantothenic acid, and vitamin B_{12}.

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